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ARMY SERVICE FORCES MANUAL

M 358-13

CIVIL AFFAIRS HANDBOOK

BULGARIA

SECTION: 13 PUBLIC

HEALTH AND SANITATION

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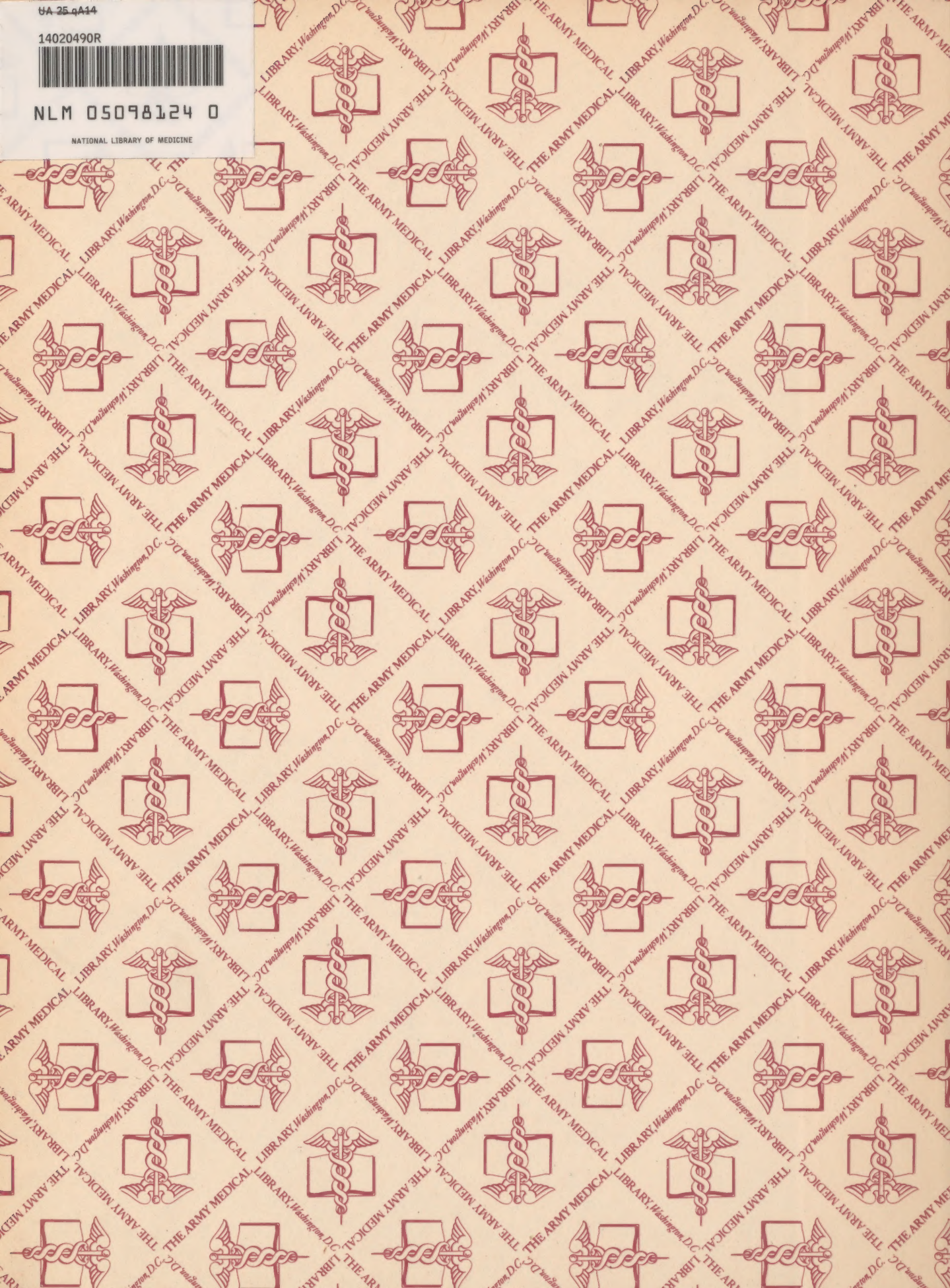
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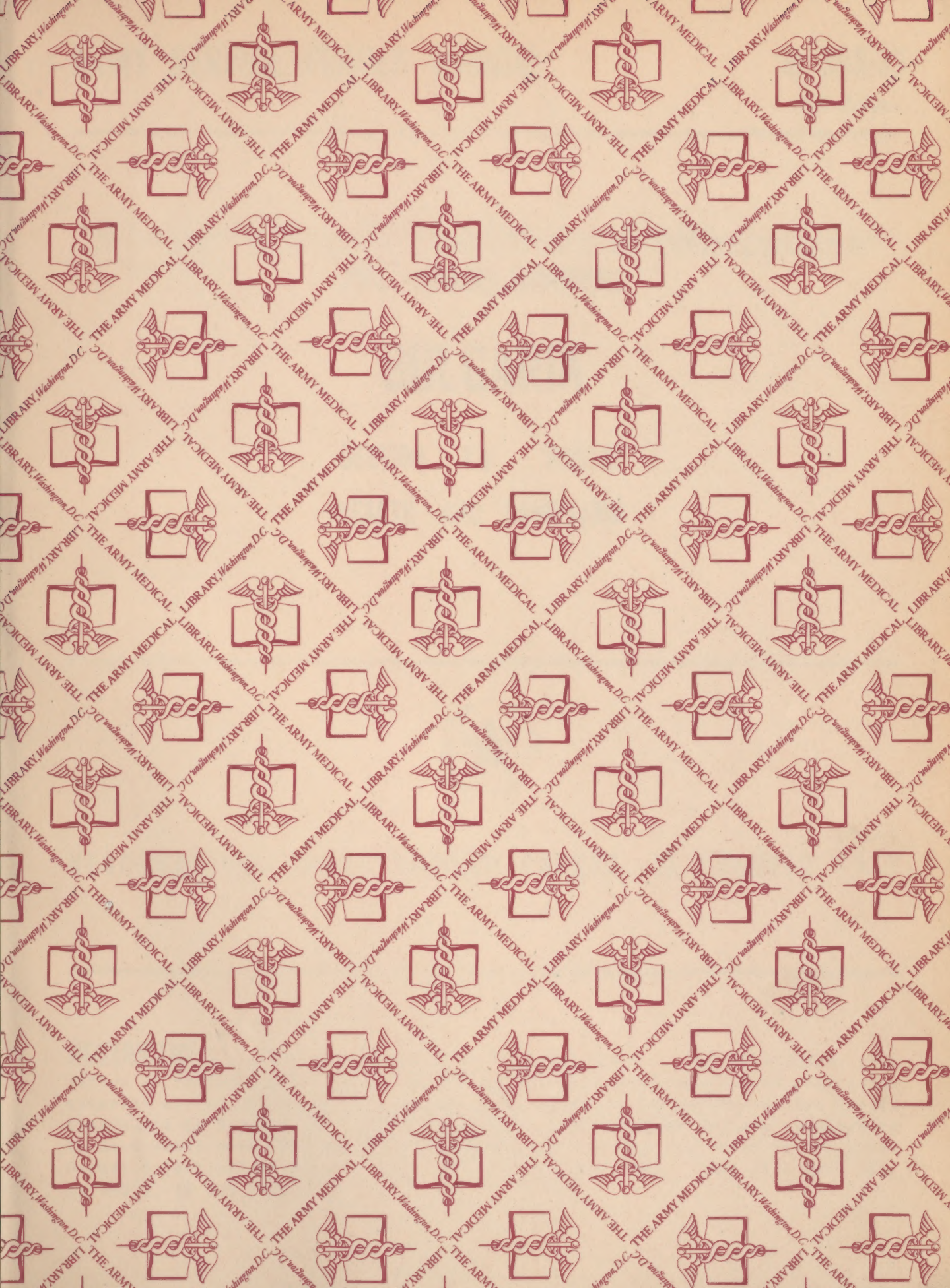
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CIVIL AFFAIRS HANDBOOK

BULGARIA

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HEALTH AND SANITATION



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M400 -	M499	Supply and Transportation
M500 -	M599	Fiscal
M600 -	M699	Procurement and Production
M700 -	M799	Administration
M800 -	M899	Miscellaneous
M900 -	up	Equipment, Materiel, Housing and Construction

* * * *

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Washington 25, D.C., 22 October 1943

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Bulgaria: Section 13, Public Health and Sanitation, has been prepared
under the supervision of The Provost Marshal General, and is published
for the information and guidance of all concerned.

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INTRODUCTION

Purposes of the Civil Affairs Handbook.

The basic purposes of civil affairs officers are (1) to assist the Commanding General by quickly establishing those orderly conditions which will contribute most effectively to the conduct of military operations, (2) to reduce to a minimum the human suffering and the material damage resulting from a disorder and (3) to create the conditions which will make it possible for civilian agencies to function effectively.

The preparation of Civil Affairs Handbooks is a part of the effort to carry out these responsibilities as efficiently and humanely as is possible. The Handbooks do not deal with plans or policies (which will depend upon changing and unpredictable developments). It should be clearly understood that they do not imply any given official program of action. They are rather ready reference source books containing the basic factual information needed for planning and policy making.

Revision for Final Publication.

The material in this section was largely prepared by the MILBANK MEMORIAL FUND and by the MEDICAL INTELLIGENCE BRANCH OF THE OFFICE OF THE SURGEON GENERAL. If additional data becomes available it will be incorporated in the final draft of the handbook on Bulgaria.

OFFICERS USING THIS MATERIAL ARE REQUESTED TO MAKE SUGGESTIONS AND CRITICISMS INDICATING THE REVISIONS OR ADDITIONS WHICH WOULD MAKE THIS MATERIAL MORE USEFUL FOR THEIR PURPOSES. THESE CRITICISMS SHOULD BE SENT TO THE OFFICE OF THE CHIEF OF THE SURVEY AND RESEARCH SECTION, MILITARY GOVERNMENT DIVISION, P. M. G. O., 2807 MUNITIONS BUILDING, WASHINGTON 25, D. C. (OR PHONE WAR DEPARTMENT EXTENSION 76322).

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1. Geographical and Social Background
2. Government and Administration
3. Legal Affairs
4. Government Finance
5. Money and Banking
6. Natural Resources
7. Agriculture
8. Industry and Commerce
9. Labor
10. Public Works and Utilities
11. Transportation Systems
12. Communications
13. Public Health and Sanitation *
14. Public Safety
15. Education
16. Public Welfare
17. Cultural Institutions and Works of Art

* This study on Public Health and Sanitation in Bulgaria was prepared for the Military Government Division of the Office of The Provost Marshal General by the Milbank Memorial Fund and by the Medical Intelligence Branch of the Office of the Surgeon General. Additional data will be available later which will be incorporated in the final draft of the handbook on Bulgaria as a whole.

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PUBLIC HEALTH AND SANITATION

Social and Economic Background -
a general summary of pertinent facts.

The Kingdom of Bulgaria, situated in the northeast of the Balkan Peninsula, and on the Black Sea, became completely independent of Turkey in 1908. The area of the country since 1919 included some 39,000 square miles and comprises the territories between the Balkan chain and the Danube, the Province of Eastern Rumelia lying south of the Balkans and the Rhodope Mountain, and the western highlands around Sofia. Bulgaria is bounded by Rumania on the north, by Yugoslavia on the west, and by Greece and Turkey on the south and southeast.

The Bulgarians or Bulgars, descendants of Turanian (or Finno-Uralian) tribes, entered the Balkan Peninsula through the plains of Dobrudja in the seventh and eighth centuries. They settled on the right bank of the Danube and on the plains toward the Black Sea, mixing with the Slavs who had settled earlier, and whose language and customs they adopted. Later they expanded westward and southward, and during the tenth century the Bulgars controlled Thrace, Macedonia, and Albania, when the national power reached its zenith under the Tsar Simeon.

After a long struggle the Bulgars, like the rest of the Balkan people, were conquered by the Turks at the end of the fourteenth century.

The five centuries of Turkish rule (1396-1878) had a profound influence on the social and cultural life of the Bulgars but, in spite of the horrors which attended the Ottoman conquest, the conditions of the Christian peasantry during the first three centuries of Turkish government were scarcely worse than they had been under the tyrannical rule of their own boyars (nobles).

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The national revival in the nineteenth century, following the establishment of a number of Bulgarian schools, abolition of Greek ecclesiastical ascendancy, and restoration of the Bulgarian autonomous church, led finally to the revolt of 1876. In 1878 the victorious advance of the Russian Army was followed by the San Stefano Treaty which was to create a greater Bulgaria, including most of the Aegean Coast, Macedonia, and Southern Serbia up to the Albanian Mountains. The great powers, fearing that the admission of Bulgaria to the Aegean would increase Russian control at Constantinople, set aside the Treaty of San Stefano, and constituted by the Treaty of Berlin (July, 1878) the Principality of Bulgaria and the autonomous Province of Eastern Rumelia, both under Turkish suzerainty (see Map 2).

In 1887, Prince Ferdinand of Saxe-Coburg and Gotha was elected Prince of Bulgaria. Turkey recognized him as Prince of Bulgaria and Vali Pasha of Eastern Rumelia. In 1908, Bulgaria declared her independence of Turkey, and the Prince assumed the title of Tsar of the Bulgarians. This was recognized by Turkey and the Powers in 1909.

Only a few years after gaining complete independence, the intense patriotism and willingness to sacrifice for the national power resulted in an excessive nationalistic ambition. Following the defeat of Turkey (1913), Bulgaria gained access to the Aegean Sea and the control of the Rhodope Mountain region, but her desire to control the whole of the Peninsula resulted in the Second Balkan War and the loss of southern Dobrudja. Hoping to achieve their great ambition, the military rulers of Bulgaria joined the Central Powers in 1915, only to lose again by the Peace Treaty of Neuilly (1919) the access to the Aegean, the Strumitza line, and several strips of territory in the West (see Map 2).

In the present war Bulgaria has again sided with Germany and Hungary. On September 8, 1940, by the Treaty of Craiova between Rumania and Bulgaria,

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Rumania ceded to Bulgaria the southern Dobrudja (Dobrogea), fixing the frontier on the 1912 line (see Map 1).

On March 1, 1941, Bulgaria signed the Three Power Pact, and on November 25, 1941 she signed the Anti-Comintern Pact. After Bulgaria's signature of the Three Power Pact, German troops, with the connivance of the Bulgarian Government, occupied the country. The British Government broke off diplomatic relations with Bulgaria on March 5, 1941, and since December 13, 1941, Great Britain has been at war with Bulgaria. The United States declared war against Bulgaria on June 5, 1942.

Following the defeat of the Yugoslav and Greek Armies by the German Army in April, 1941, the Bulgarians occupied western Thrace, eastern Macedonia, and the districts of Florina and Kastoria, in Greece, and the whole of Southern Serbia, in Yugoslavia (see Map 2).

GOVERNMENT

By the constitution, the legislative authority was vested in a single chamber called the Sobranje. According to a new electoral law (1937) the number of seats in the Sobranje was fixed at 160. Electors comprise all males over 21 and all married females over 21. A general election held on January 30, 1940 resulted in the return of 140 supporters of the government and an opposition of 20 (including 9 communists).

The executive power is entrusted to a cabinet of 10 members: the Ministers of Interior and Public Health, Foreign Affairs, Finance, Justice, Agriculture, Commerce, Public Works, Education, Railways, and War. The local administration, which was organized on the Belgian model, is under the control of the Minister of the Interior. Prior to 1934, the country was divided into 22, and later 16, provinces (okruzi), each administered by a prefect (upravitel), and 84

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districts (okolia), each under a subprefect (okoliiski natchalnik). The number of these functionaries was excessive. In 1934 the country was divided into 7 regions (oblasti), each under a governor. The regions are subdivided into districts under subprefects or district governors, and the districts include municipalities, each under a mayor. The governors of the regions, district governors, and mayors, are appointed by the Minister of the Interior and Public Health.

AREA AND POPULATION

The area of Bulgaria, since the Peace Treaty of Neuilly (1919), is 39,825 square miles and the Census population on December 31, 1934 was 6,071,939 as against 5,478,741 in the Census of 1926. In 1934, 21.4 per cent of the population was urban and 78.6 per cent rural.

Population by Regions (Provinces), According to
Census of December 31, 1934

Region	Area in Square Miles	Population	
		Total	Per Sq. Mile
Burgas	5,258	554,947	106
Plovdiv	6,115	801,755	131
Pleven	5,960	996,686	167
Shumen	5,690	1,020,499	177
Sofia	6,502	1,152,053	177
Stara-Zagora	6,002	812,633	135
Vratza	4,298	739,366	172
Total	39,825	6,077,939	153

The total population (within the 1919 boundaries) was estimated at the end of 1940 at 6,357,000. On September 8, 1940, by the Treaty of Craiova (between Rumania and Bulgaria), Rumania ceded to Bulgaria the two provinces of southern Dobrudja - Durostor and Caliacra with an area of 2,983 square miles and a total population of about 373,000 (see Map 1).

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Sofia, the capital, had a population (1934) of 287,095 (including suburbs, 327,798). Other provincial towns with a population (1934) of over 25,000 were as follows: Plovdiv 99,883; Varna 69,944; Ruse 49,447; Burgas 36,230; Pleven 31,520; Sliven 30,571; Stara-Zagora 29,825; Haskovo 26,516; Shumen 25,486; and Yambol 24,920.

Before the present war Bulgaria was ethnically more homogeneous than most of the Balkan countries, in spite of considerable regional differences in physical characteristics, speech, and customs. The Turks, representing about 10 per cent of the total population, are Bulgaria's principal minority. They live mostly in the northeast in the Shumen region and along the southern frontier. According to the 1934 Census there were some 134,000 Gypsies (mostly Moslem) scattered throughout the country; 69,000 Rumanians, mostly in the Vidin area on the Danube; 48,000 Spanish-speaking Jews; and 27,000 Armenians.

Bulgaria is the most agrarian country of Europe, the agricultural population being over four-fifths of the total. About 78.6 per cent of the population (1934) lives in villages, but the urban population (21.4 per cent) includes many agriculturists and gardeners.

RELIGION

The national faith is that of the Orthodox Church, though in 1870, in consequence of its demand for, and acceptance of, religious autonomy, the Bulgarian Church was declared by the Patriarch of Constantinople to be outside the Orthodox Communion. The Church is governed by the Synod of Archbishops.

There were, according to the last Census of 1934, 5,128,810 members of the Orthodox Church of Bulgaria, or 84.4 per cent of the total population; there were 821,298 Moslems (13.5 per cent) of which 102,351 were Pomaks or Moslem Bulgarians; 48,398 Jews (8 per cent); 45,704 Catholics (8 per cent); and 33,649 others.

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PRIMARY EDUCATION

Elementary education is obligatory and free for children between the ages of 7 and 14. The 1934 Census showed that 20.4 per cent of the male population, and 42.8 per cent of the female population, were illiterate.

FINANCE

In 1940, the revenue of Bulgaria was 11,822.6 millions of leva* (about \$142,000,000) and the expenditure was 11,422 millions of leva (\$137,000,000). The main items of the total estimated expenditures for 1940 of 8,461.8 million leva were as follows: Ministry of War, 2,896; Ministry of Education, 1,072.8; Ministry of the Interior and Public Health, 650.6; Ministry of Agriculture, 576.4; Public Works, 342.8; and public debt and expenditure connected with the compulsory labor service, 1,817 millions of leva.

The total consolidated and nonconsolidated foreign debt was estimated at 12,483 million leva (\$150,000,000), while the internal debt amounted to 11,767.5 million leva (\$141,000,000).

PRODUCTION AND INDUSTRY

According to the 1934 Census, 80 per cent of the active population (2,744,927) were engaged in agriculture, most of them being small proprietors holding from 1 to 6 acres. The methods of cultivation are in general primitive, although during recent years an increasing amount of agricultural implements and machinery was imported to Bulgaria, mostly from Germany. In some districts intensive cultivation of industrial crops, such as cotton, flax, hemp, and tobacco, is carried out.

The total area of Bulgaria is 25,488,343 acres. Of these, in 1938, the

* In 1939 the leva was equivalent to 1.20 U.S. cents.

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cultivated area was 11,266,393 acres (or 44.2 per cent), and the forest area, 8,236,398 acres (or 32.3 per cent).

In 1938, a total area of 6,552,992 acres yielded 3,312,490 metric tons of cereal distributed as follows:

Cereal	Area		Yield	
	Acres	Per Cent	Metric Tons	Per Cent
Wheat	3,447,372	52.6	2,149,674	64.9
Rye	464,621	7.1	188,023	5.7
Barley	557,040	8.5	353,914	10.7
Oats	353,091	5.4	88,591	2.7
Maize	1,730,868	26.4	532,288	16.0
Total	6,552,992	100.0	3,312,490	100.0

Fruits grow in abundance, especially in the neighborhood of Kustendil and Plovdiv. In 1938 the area under vines was 283,651 acres; cotton yielded 69,467 quintals from 135,949 acres; and sugar production was 19,638 metric tons, the area under beets being 25,919 acres. In 1937, 13,957 acres were under rose cultivation. The tobacco area in 1938 was 76,890 acres, and the yield, 25,901 metric tons. In 1938 the production of silkworm cocoons was 2,178,767 kilos valued at 99.4 million leva.

According to the 1934 Census, there were in Bulgaria 531,519 horses, 1,497,624 cattle, 8,839,492 sheep, 913,088 goats, 901,976 pigs, and 12,772,740 poultry.

Industry is not greatly developed in Bulgaria. On January 1, 1939 there were 3,381 undertakings in operation. Mining development has been slow. The country is rich in coal; there are three State mines (at Pernik, Bobovdol, and Maritza) and several privately-owned mines. The total coal production in 1937 was 1,852,544 metric tons, of which 1,512,520 tons came from the State mines.

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In 1937, 3,548 metric tons of aluminum and 9,745 of salt were mined.

COMMERCE

During the three years 1938 to 1940 the exports of Bulgaria were valued (in millions of leva) at 5,579, 6,065, and 7,019; and the imports at 4,934, 5,197, and 7,028. Both in exports and in imports, Germany (including Austria) occupied the leading place, absorbing about 58.9 per cent (in value) of the total exports in 1938, and 67.8 per cent in 1939, while imports from Germany (including Austria) represented (in value) 51.9 per cent of the total in 1938, and 65.5 per cent in 1939. The main articles of export in 1939 were (value in millions of leva) tobacco, 2,486 (or 41.0 per cent of the total exports); fruit, 1,114 (or 18.4 per cent); eggs, 512; and wheat, 443. Among imports the most important in 1939 were: machinery and war material, 1,373 millions of leva (or 26.4 per cent of the total imports); metal goods, 1,015 (19.5 per cent); textiles, 793 (15.3 per cent); and vehicles, 438 millions of leva (8.4 per cent), followed in importance by mineral oils, chemicals, and leather goods.

SHIPPING AND COMMUNICATION

The Bulgarian mercantile marine in 1939 included 14 vessels - a total of 17,476 tons.

The number of vessels entered at the Black Sea ports of Bulgaria in 1939 was 9,311, totaling 1,776,576 tons. At all the Danube ports in 1939, 15,175 vessels totaling 2,429,642 tons were entered and 15,169 of 2,435,013 tons were cleared.

There were 19,638 miles of road in Bulgaria in 1939, 1,941 miles of railway of ordinary gauge, and 270 miles of narrow gauge.

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VITAL STATISTICS

The birth rate in Bulgaria, though higher than in most European countries, is lower than in Rumania, Yugoslavia, and Greece; since 1921 it has also decreased more rapidly in Bulgaria than in these three countries. In Bulgaria the rate fell from 39.0 per 1,000 population in 1921-1925 to 29.3 in 1931-1935, and as low as 21.4 in 1939. In spite of the general decrease, the birth rate is still above 30 per 1,000 population in many of the more isolated rural districts. During recent years the lowest rates were reported in the area situated between the Balkan range and the Danube (regions of Pleven and Vratza).

The general mortality is lower in Bulgaria than in the other Balkan countries; it decreased from 20.8 per 1,000 population in 1921-1925 to 17.9 during the following five-year period, to 15.5 in 1931-1935, and fell below 14 per 1,000 population from 1936 to 1939.

The most important causes of deaths in Bulgaria are those attributed to the pneumonias and to tuberculosis. According to the 1939 statistics for the Bulgarian towns (aggregate population 1,353,000), deaths due to the pneumonias represent 151 per 100,000 population, and deaths ascribed to tuberculosis of the respiratory organs, 128.

Infant mortality has not decreased to any great extent in Bulgaria since 1921. The rates are about the same as in Yugoslavia, but lower than in Rumania.

The rates in Bulgaria were 156 per 1,000 live births from 1921 to 1925; 147 during the periods 1926-1930 and 1931-1935; 144 in 1938; and 138 in 1940. From 1931 to 1935 the infant mortality rate was 153 in Yugoslavia and 182 in Rumania.

AGRICULTURAL OVERPOPULATION

Bulgaria, like other countries of Southeastern Europe, has some important

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agrarian problems. Among them are inadequate resources, poor soil, an irregular climate, small farms, scattered holdings, and increasing population. The population has more than doubled during the past fifty years. The density of the rural population per 100 acres of cultivated area increased from 36 in 1910 to 45.7 in 1926, and to 46.5 in 1934. The proportion of holdings of less than 12.4 acres rose from 57 per cent in 1926 to 63.1 per cent in 1934. Through extensive and continuous subdivisions the average Bulgarian farm of 12.4 acres now consists of 15 different strips, and Bulgarian economists estimate that 7 to 10 per cent of the human labor and 10 to 20 per cent of the animal labor is wasted in traveling to and from scattered fields.

Yields, though higher than in Yugoslavia and Rumania,* are low, both because of climatic factors and the primitive nature of the country. Yields in the more densely populated districts are lower than for the country as a whole. Even the primitive and wasteful agriculture does not utilize all the manpower available, and it is estimated that less than 60 per cent of the available agricultural labor can be effectively utilized. The number of persons occupied in agriculture per square mile of cultivated land was 171 in Bulgaria against 163 in Yugoslavia and 148 in Rumania.

During the early postwar years Bulgaria had further to provide shelter to more than 40,000 refugee families. The settlement of refugees was carried out with the assistance of the League of Nations; land was provided for some 32,000 families and about 11,000 model houses were built out of a loan specially raised on behalf of the refugees.

Before the present period, the government had adopted a number of measures designed to promote the resettlement of inhabitants from overpopulated or unproductive areas and the reintegration of scattered and divided holdings.

*17.7 bushels of wheat per acre against 16.5 in Yugoslavia and 13.5 in Rumania.

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The government also was fostering intensive agriculture for export crops, especially tobacco and grapes, and industrial raw materials, such as cotton.

References:

League of Nations: European Conference on Rural Life. National Monographs Drawn up by Governments: BULGARIA. Geneva, 1940.

League of Nations: Scheme for Settlement of Bulgarian Refugees (general description and principal documents). Geneva, 1926.

COMPULSORY LABOR SERVICE

The compulsory labor service was established in 1921 under the General Directorate of Compulsory Labor, at first controlled by the Ministry of Public Works and later placed under the control of the Ministry of War. The annual contingent of workers (trudovacs) called up varies from 20,000 to 25,000. The work carried out is mainly in connection with railway and road construction but includes also the correction of rivers and waterways and the construction of embankments and water mains. The value of work performed in 1936 was estimated at 10 million leva.

In addition to the workers called up each year for compulsory service, every Bulgarian male, aged 20 to 45 years, is liable to temporary service of 10 days per year. In 1936 some 681,000 persons performed their service and 127,000 commuted their obligation by payment of a fee. In spite of the low efficiency of the temporary workers and lack of initiative among village mayors, who are responsible for the working of the system, the temporary service is of great economic advantage to rural districts. The work performed includes construction and repair of roads, bridges, and water mains; manufacture of bricks; transport of building materials; as well as land drainage.

Reference:

International Labour Office: The Results of Compulsory Labour Service in Bulgaria from 1933 to 1936-1937. International Labour Review, 1938, vol. 38, pp. 510-519.

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ORGANIZATION OF PUBLIC HEALTH SERVICES

The public health administration in Bulgaria consists of a central authority - the Directorate of Public Health of the Ministry of the Interior and Public Health - and local administration including regional (provincial), district, and communal health services.

The country is divided into 7 regions (provinces), each having a regional medical officer of health, and further, into 84 districts (see Map 3) with a part-time medical officer in charge of each district.

The Directorate of Public Health

The Directorate of Public Health, under a Director General, is a part of the Ministry of the Interior and Public Health. During the early postwar years the Directorate had a great deal of autonomy and the Director General had wide powers and maintained direct connections with other ministries. Later, especially during the period of military dictatorship (1934-1937), the powers of the Director General varied according to the good will of the Minister of the Interior and Public Health. For many years the activities of the Directorate, as well as its budget, were greatly influenced by the prevailing political conditions. An improvement of this situation came in 1939 when the newly reestablished Sobranje or National Assembly (suppressed by the 1934 coup d'état) voted, in addition to the regular budget of the Directorate of Public Health, a special appropriation amounting to 20 million leva* (or about one-fifth more than the regular budgetary allocation) for the improvement of hospitalization, sanitation, and general public health.

In 1940, the new Minister of the Interior and Public Health (P. D. Gabrovski, a doctor of medicine and a former Rockefeller Fellow), who is credited with a clear understanding of the public health problems of the country, stated

* \$240,000.

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his determination to inaugurate a program of general sanitation in Bulgaria.

According to a statement made in 1937, the Directorate included the following technical divisions in addition to a budget and control division: Hygiene and Social Medicine, Hospitals and Dispensaries, Infectious Diseases and Vital Statistics, Pharmacies and Control of Drugs, and The Institute and School of Public Health.

According to more recent publications, there are 8 divisions in the Directorate of Public Health. It is not clear, however, whether each of these divisions has a director of its own or whether some of them are under the authority of the Director of the Public Health Division and under the Director of the Division of Epidemiology and Statistics.

Although no record was made in official publications of a reorganization of the Directorate, in 1941 the Bulletin of the Directorate refers to the following divisions:

1. Health Service, including administration, hygiene, and statistics.
2. Contagious Diseases.
3. Social Diseases (malaria, tuberculosis, venereal diseases, trachoma).
4. Medical Institutions (hospitals and institutions dealing with the treatment of patients).
5. Pharmacies and Medical Supplies.
6. Spas, Climatic Stations, and Seaside Resorts.
7. Budget and Control.
8. Institute and School of Public Health.

In the absence of any annual reports on the activities of the Directorate of Public Health, no precise information is available about the functions of the various divisions of the Directorate. The following summary of the main duties

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of those divisions is based on current reference to rules and regulations as included in the monthly Bulletin of the Directorate and on an outline of the organization of public health in Bulgaria, published in 1926:

1. The Health Service Division, dealing with administration, hygiene, and statistics, corresponds to the former Public Health Division. Its authority extends over questions relating to the medical personnel, urban sanitation, inspection of foodstuffs, and medical inspection of buildings. The division deals with the drafting and enforcement of sanitary regulations. A technical service attached to this division plans and designs building schemes proposed by the Directorate of Public Health.

Since 1940, the statistical service of the Directorate of Public Health has been attached to the Health Service Division.

2. Contagious Diseases Division. This division, referred to in the Bulletin of the Directorate of Public Health for the first time in 1941, presumably includes the epidemiological service of the former Division of Epidemiology and Health Statistics. It is likely that this new division remained under the directorship of Dr. Chr. Danof, who in 1941 was still referred to as Chief of the Division of Epidemiology and Health Statistics (see Appendix I).

The duties of the division include supervision of the epidemiological condition of the country; it sees that laws, regulations, and circulars relating to campaigns against infectious diseases are properly observed by local authorities; it deals with specialized personnel, including bacteriologists and epidemiologists; and inspects bacteriological laboratories, depots of serums and vaccines, disinfecting material, and frontier medical stations. The division keeps in touch with the bacteriological laboratories and epidemiological services of the Regional Health Services.

Up to 1940 the public health statistics were dealt with in the Division

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of Epidemiology and Public Health Statistics. Since the beginning of 1940 the tabulation of data on acute infectious diseases, as reported by local health authorities, was transferred to the Central Statistical Bureau. In 1941, as stated above, the public health statistics were dealt with by the Health Service Division.

3. The Social Diseases Division, set up in 1941, deals with malaria, tuberculosis, venereal diseases, and trachoma. The former Division of Epidemiology included a chief medical inspector of malaria and an inspector of tuberculosis and venereal diseases.

The Malaria Inspectorate, created by law in 1919 as a part of the Directorate of Public Health, was, in practice, largely independent and controlled its own funds. Since the suppression of this inspectorate in 1931 the work has been transferred to local health authorities, remaining, however, under the supervision of the Chief Inspector of Malaria.

4. The Medical Institutions Division. The former Hospital Division deals with the administration of hospitals and sanatoria. It supplies material and appliances to these establishments as well as to quarantine stations, ambulances, etc.

5. The Pharmacies and Medical Supplies Division inspects drug depots and state pharmacies. It supplies them with drugs, bandages, and other medical supplies. The division issues licenses to chemists, supervises their professional activities, and controls the quality and prices of the articles they supply to the public. The division controls, jointly with the Chief Inspector of Malaria, the quinine monopoly, and settles questions connected with the importation of foreign drugs.

6. The Division of Spas, Climatic Stations, and Seaside Resorts deals with the problems connected with health resorts.

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7. The Budget and Control Division prepares the budgets of the Directorate of Public Health after consultation with the Director General of Public Health, the chiefs of Divisions, and the General Medical Council. It examines requests for credits submitted by the chiefs of Divisions. The chief of the Budget and Control Division is assisted by comptrollers representing the Ministry of Finance.

8. The Institute and School of Public Health is a separate division of the Directorate of Public Health.

The Institute of Hygiene was for some years housed in provisional premises. In the early thirties the Rockefeller Foundation granted 19 million leva towards a new building and the State contributed 20 million leva. In 1936, purchases of instruments and equipment in the amount of 3 million leva were made in Germany. A certain amount of research is carried out at the Institute.

An important part of the activities of the Institute of Hygiene is the Rural Health Demonstration Service established near Sofia in 1938.

In 1937, there were three departments in the Institute:

1. The Department of Microbiology produces sera and vaccines which are generally given free of charge to public health institutions; it also controls and standardizes the diagnostic methods for the country as a whole.
2. The Department of Chemistry examines the foodstuffs, drugs, pharmaceutical preparations, and waters, and makes chemical analysis in connection with judicial proceedings.
3. The Department of Hygiene is concerned with the study of hygiene and health education.

The first two departments, both of a completely technical nature, were established in the building as soon as this was ready. For political reasons the establishment of the Department of Hygiene proved considerably more difficult. In 1938, a comparatively unknown man, Dr. Sharoff, was made Director of the Department. At the same time, however, the Minister of Interior had moved into the

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premises with all his administrative offices, awaiting the construction of his own building.

A School of Public Health attached to the Institute organizes courses for physicians and auxiliary health personnel. According to the Health Law of 1929, physicians must have taken a special course in public health in order to obtain permanent government posts. The course is free and between 30 to 40 physicians have attended the courses yearly. For practical instruction the Institute uses the Sofia Health Center which was established in 1931; more recently the village health center in Golemo Komarje, established in 1933, has been used for the practical training of health visitors and nurses.

References:

League of Nations: Report on the Meeting of Directors of Institutes and Schools of Hygiene. Bulletin of the Health Organisation, 1938, vol. vii, pp. 169-427.

The Rockefeller Foundation, International Health Division, Annual Report, 1938, pp. 147-148.

Sofia Health Center

This Center, established with the assistance of the Rockefeller Foundation in 1931, now occupies an integral position in the municipal health service. It deals chiefly with tuberculosis, child hygiene (dental, X-ray, etc.), school and preschool hygiene. It is a training center for public health nurses, giving both a short three months' course and a six months' course leading to a diploma in public health nursing. Four other centers modeled on the first Sofia Health Center have been established in the City.

All physicians taking part in the two annual courses given by the School of Hygiene for Medical Officers of Health spend from one to two weeks in this Center.

The Medical Director of the Center in 1938 was Dr. H. Boyadjieff.

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Regional and Local Health Service

The Region. Following the administrative reorganization in 1934, the 16 provincial health services were replaced by 7 regional health services, each under a full-time medical officer who has authority over the district and municipal medical officers and all the health institutions within the region. He examines jointly with the Governor of the Region the health budgets of the rural communes and deals with the regional public health council. The public health council advises the governor on public health needs, i.e., opening and maintenance of hospitals and homes and distribution of free drugs to the indigent. The council also provides special grants for public health. However, as the funds during the last few years were provided, to a large extent, by the government, the role played by these councils was not very important.

The 7 Regional Health Services (located at Sofia, Burgas, Pleven, Shumen, Stara-Zagora, and Vratza) include a number of technical services such as an epidemiological division, maternal and child welfare center, and a bacteriological laboratory. The precise distribution of the services and technical staff of the Regional Health Services is not available (see Table 3). In 1940, however, 3 new epidemiological divisions were created at Plovdiv, Stara-Zagora, and Shumen, and the epidemiological service of the General-Directorate at Sofia was transferred to the Sofia Regional Health Service.

Each regional epidemiological division is composed of 1 physician (district physician), 1 feldsher* or nurse, and 1 helper.

Under the recent emergency rules (1940) the medical personnel attached to the Ministries of Labor, Education, and Railways, was put at the disposal of the Regional Health Services whenever physicians were needed in district, communal, or hospital services.

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*Assistant.

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BULGARIA

REGIONAL AND LOCAL PUBLIC HEALTH ORGANIZATION

STATE:

MINISTER OF
THE INTERIOR AND PUBLIC HEALTH

General Medical
Council

Director General

General Directorate
of Public Health

REGION (OBLASTI): Governor - - Regional Medical Officer

Seven Regional Health Services
Epidemiological Division, Child
Welfare Center, Bacteriological
Laboratory, etc.

Regional
Public Health
Council

DISTRICT (OKOLIA): Sub-Prefect - - District Medical Officer*

Eighty-four District
Health Services

COMMUNE: Mayor - - Communal Medical Officer*

952 Rural Health Centers
(Primary Centers)
Including 636 (65 Per Cent)
Served by Medical Officers,
Others by Assistants

-- -- Advisory bodies.

* Serving on part-time basis.

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The District. Each administrative district (see Map 3 and Appendix II) has a district health service under the direction of a medical officer. In 1940 there were 84 district health services in Bulgaria and 5 urban health services in Sofia, Burgas, Varna, Plovdiv, and Ruse. The district medical officers are under direct orders of the regional medical officers. Their duties include the supervision of the local health services, both in villages and towns, and treatment of the indigent patients either in the district center or in rural dispensaries. Some of the district medical officers are, at the same time, in charge of the small local hospitals (known as third-class hospitals) having 30 to 50 beds. The district medical officers and heads of urban health services are free to practice privately.

The Commune. At the basis of Bulgaria's health organization is a network of primary health centers or rural health services which, by law, must exist in every commune. Of the 952 rural health services or primary health centers in operation in 1938, 636, or 64.7 per cent, were in charge of communal health officers, the others being directed by assistants. The communal medical officer is a private practitioner performing his duties as head of the local service on a part-time basis.

Rural Public Health Policy

Medical assistance in rural areas and the establishment of local health institutions is one of the major public health problems in Bulgaria, where nearly 80 per cent of the population live in villages. For many years the fundamental policy of the government was to provide facilities to the local administrative units in order to secure communal health centers and to encourage the communal cooperative or private initiative in the field of medical assistance. The primitive character of most of the rural areas, low-income level of the population,

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and the indifference of the village population to most of the health problems, compelled the government to assume a greater part of the responsibility in medical assistance to rural areas.

A system of rural health centers (primary centers) and a program of minimum requirements for rural areas as recommended by the European Conference on Rural Hygiene (Geneva, 1931), was adopted by the Bulgarian Government. However, the economic depression and the growing poverty of the villages has prevented the development of the adopted scheme. In 1933, the government had to take over from the communes the responsibility for the free treatment of destitute patients and the payment of salaries to communal medical officers.

At the beginning of 1938, only 222 of the 952 rural health services or primary centers were housed in premises specially built for the purpose. The extreme isolation of most of the villages is a major problem - only 9 per cent of the rural health services were connected with the outer world by railroad and some 20 per cent by road. Only 36 per cent of these villages possessed a public water supply.

In 1938, a loan of 15 million leva (\$180,000) secured by the government from the proceeds of the State Health Fund was to be utilized for the establishment of 250 to 300 new health centers. The communes interested in obtaining non-repayable grants for the establishment of a health center must, however, be able to meet two-thirds of the cost of the center.

Reference:

League of Nations, Health Organisation: European Conference on Rural Hygiene. Recommendations, vol. I. Geneva, 1931.

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Rural Health Demonstration Service

In 1938, a Rural Health Demonstration Service was established with the assistance of the Rockefeller Foundation at Novoseltzi near Sofia in a district comprising 12 villages. The School of Hygiene and the Faculty of Agriculture have together worked out a plan for the activities of this service:

1. A service of preventive medicine with:
 - (a) A specialist in Hygiene as Director
 - (b) Four practicing Medical Officers of Health
 - (c) Three Public Health Nurses
 - (d) One Midwife
 - (e) One Sanitary Inspector

In this service particular attention is to be paid to the sanitation of water supplies, sewage, manure and waste disposal, and milk sanitation.

2. Agricultural improvement:
 - (a) Crop improvement with scientific rotation, selection of seed, its treatment, etc.
 - (b) Silage installations and crop regulation for the proper improvement and provision of silage
 - (c) Stock improvement, with special reference to (1) dairy animals and (2) poultry
 - (d) Cooperative development for the handling and sale of cash crops and milk products
3. Social betterment:
 - (a) Classes for peasant women and girls in cooking, gardening, sewing, housekeeping, and other household arts and activities
 - (b) Day nurseries
 - (c) Play organization for village children

One of the problems has been student living quarters at the Demonstration Center. In 1939, apart from the lack of a sanitary inspector, which has made itself felt in the sanitation of the place, the Demonstration Center has on the whole functioned rather well.

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Health Institutions and Personnel

Hospitals. In Bulgaria, in 1939, there were 64 State, 2 municipal, and 94 private hospitals, with a total of 9,942 beds (see Table 1). Of these there were only 20 larger hospitals classified as "first class" with a total of 5,897 beds and 17 "second-class" hospitals with 1,080 beds. The first-class hospitals are larger institutions with several services; the second-class hospitals have surgery and internal medicine services; while the third-class hospitals, usually with less than 50 beds, are attended by one physician only.

The establishment of small hospitals - one for every 30,000 inhabitants - recommended by the 1931 Conference has not proved practicable in Bulgaria. In recent years preference was given to the establishment of larger, better-equipped institutions, which are also more economical to run. In 1939, there was one hospital (excluding mental hospitals) per 31,000 population in the Sofia and Pleven regions, and one hospital per 53,000 population in the Shumen and Plovdiv regions. The average number of beds per 1,000 population was lower in Bulgaria (1.75) than in Yugoslavia (about 2).

In 1939, there were 14 hospitals with services for tuberculous patients, with a total of 953 beds; 1 maternity hospital of 150 beds (at Sofia); and 2 mental hospitals with a total of 700 beds.

Sanatoria. Bulgaria has 2 State sanatoria for tuberculous patients with a total number of 680 beds, 3 private sanatoria with 143 beds, in addition to 1 State sanatorium for surgical tuberculosis, with 320 beds. There were, further, 9 State-owned climatic stations with some 300 beds.

Physicians. There were 3,127 physicians (1 per 2,033 inhabitants or 4.9 per 10,000 population) in 1939, of which 2,477 or 79 per cent, were in towns and 650 in villages (see Table 2). There was 1 physician per 3,107 inhabitants in the Vratza region, 1 per 2,511 in the Burgas region, while the proportion was

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1 per 910 inhabitants in the Sofia region owing to the great number of physicians residing in the capital.

A large proportion of the physicians in Bulgaria are employed by the State, mostly on a part-time basis. The heads of district and communal health services as well as government hospital doctors are allowed to practice privately.

Feldshers. The feldshers, or medical assistants, were introduced into the public health service owing to the shortage of civilian and military doctors. The feldshers were graduated after two years of study and were required to have received a secondary education; noncommissioned officers of the medical corps can also be graded as feldshers. There were 1,190 feldshers in 1939; of these, 640, or 54 per cent, resided in villages. After ten years of service to the State, or to the district or commune, a feldsher has the right to practice medicine in rural districts where there are no medical officers. In 1939, a total of 216 primary health centers were directed by feldshers.

Midwives. Bulgaria had 918 licensed midwives in 1939, of which 45 per cent resided in villages; 187 were employed by the State, and 262 by the communes. Of the 469 midwives in private practice only 50 were located in rural areas.

The first school for midwives was founded in Sofia in 1895. Under the new regulations adopted in 1937 the regular courses last two years, but one-year courses are given to midwives desiring to practice in rural districts.

Nurses. There were only 462 graduate nurses in Bulgaria in 1939, of which 248 were in State service, 44 were employed by the communes, and 170 were in private practice.

In 1936 the education of nurses and the nursing problems were studied by an American expert (Miss Hazel A. Goff) prior to the adoption of a new educational program for nurses. The first school for nurses was founded by the Bulgarian Red Cross at the beginning of the century. This school now trains from

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30 to 40 nurses every year; some of them after undergoing additional training become district visiting nurses. (See also under Sofia Health Center, p. 17.)

Other Personnel. In the absence of a dental faculty in the country most of the Bulgarian dentists were trained abroad (mostly in Germany). There were, in 1939, 360 dentists, including 56 in State and 56 in communal service.

Social Insurance

Compulsory insurance covering accident, sickness, maternity, invalidity, and old-age risks of all wage-earners is administered by the social insurance fund controlled by the Directorate of Labor and Social Insurance. Out of a total social insurance fund expenditure of 143 million leva in 1937, 41.4 million leva were spent on cash benefits and medical assistance in sickness and maternity insurance.

In recent years the scope of the insurance was extended to temporary workers (such as harvest laborers) and others having no permanent employer. Insurance is optional for independent workers and persons whose yearly incomes do not exceed 50,000 leva. Invalidity and old-age insurance is gradually being extended to cover larger categories of workers. In 1941 a law, effective January 1, 1943, instituted old-age pensions for the peasantry as well as for manual workers. A monthly pension of 300 leva (\$3.60) will be granted to peasants on reaching the age of 60. In order to qualify for the pension every peasant must contribute 60 leva (72 U. S. cents) per annum.

Compulsory school mutual-aid funds under the Ministry of Education were set up by law in 1942. The object of these funds is to establish health institutions for school children, preventoria, and vacation centers, and to organize assistance in case of sickness.

Reference:

International Labour Office: The Application of Social Insurance in Bulgaria. International Labour Review, 1938, vol. 37, pp. 667-676.

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Public Assistance

During the years following the economic depression the government had to assume an increasing share of responsibilities in the field of public assistance and relief in local areas. In 1934, a Department of Public Assistance was created under the Ministry of the Interior and Public Health. The Department is responsible for the relief of the poor and for the supervision and coordination of the activities of various welfare organizations such as the Child Welfare Union and the Bulgarian Red Cross.

Indigents are divided into two categories determined by a means test. Category I is entitled to assistance in the form of food, supplies, or even cash. The assistance is given through communal institutions or philanthropic societies on the instructions of the communal public assistance office. Category II, of somewhat higher income, is helped through tax exemption and relief in case of death.

A special form of assistance to the rural population was instituted by the law of 1928 pertaining to relief of victims of public disasters. The assistance includes cash allowances to the distressed communities and individual relief based on distribution of cereals, either as a loan or in exchange for work done. This method of relief is claimed to be very satisfactory and the payment of wages in kind (cereals) is not considered as a charity by the rural population.

The Bulgarian Red Cross. Under the law for relief of victims of public disasters the responsibility of organizing and centralizing relief activities lies with the Ministry of the Interior and Public Health. This responsibility is delegated, in case of disaster, to the Red Cross and gives to that society and its local branches exclusive rights of providing relief and coordinating the activities of other welfare associations.

The Child Welfare Union. In 1937, the Union had 1,869 branches, or

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almost one in every village of the country, and controlled 4,711 institutions. These institutions included 2 homes for infants, 66 crèches for a total of about 3,200 children, 30 orphanages for 1,525 children, and 3,329 school canteens providing meals for about 214,000 children. The 553 maternal and infant consultation clinics organized by the Union received a total of 222,000 visits.

References:

League of Nations: European Conference on Rural Life. National Monographs Drawn up by Governments: BULGARIA. Geneva, 1940.

League of Nations: Child Welfare Information Centre. Annual Report on Child Welfare (June 19, 1939). Geneva, 1939.

CONTROL AND PREVENTION OF ACUTE AND CHRONIC DISEASES

CHRONIC DISEASES

Tuberculosis

In spite of the development of medical assistance in rural areas and some improvements in public health, the tuberculosis problem received little attention during the last 20 years and few reports are available for true appreciation of the situation in Bulgaria. It is known, however, that the disease is an important cause of mortality and morbidity. As in other countries of Southeastern Europe, there is evidence in Bulgaria of a steady increase of the incidence of tuberculosis in rural areas. Thus, in spite of a substantial decrease of tuberculosis mortality in Bulgarian towns during the last 20 years, tuberculosis is one of the most serious public health problems of this predominantly rural country. The infection is usually carried to the village by servants, workmen, and soldiers returning to rural areas who have contracted the disease in towns. This process is practically unchecked owing to the lack of diagnostic facilities and grossly inadequate treatment and isolation facilities.

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The overcrowded dwellings, general poverty, and inadequate food of the village population create favorable conditions for the further spread of the disease in rural areas.

Under present conditions, the wartime emigration of the civil population and movement of troops will further contribute to the spread of the disease among the less tuberculinized groups of the population in more isolated rural districts.

According to mortality statistics for 50 Bulgarian towns (aggregate population 850,000 in 1921) from 1905 to 1922, tuberculosis was responsible for 15 to 16 per cent of deaths from all causes, and the deaths attributed to this disease corresponded to a rate of from 250 to 350 per 100,000 population. From 1933 to 1939, the tuberculosis mortality in the towns (population about 1,353,000) varied from 115 to 135 per 100,000 population, and the proportion of deaths ascribed to tuberculosis represented 10 to 11 per cent of the deaths from all causes. The tuberculosis mortality rates are, as a rule, higher in the smaller towns than in Sofia.

Evidence of the increasing prevalence of the disease in rural areas was shown by military statistics (1926) and by a survey in the Stara-Zagora area in 1932. Data collected by the Army covering a period of 10 years show a morbidity rate among recruits from towns, between 20 and 25 years of age, of 7.6 per 1,000 while the rate among recruits from rural districts was 8.9 per 1,000.

Dispensaries. In 1939, there were 15 State dispensaries, 2 in the regions of Burgas, Vratza, and Shumen, respectively, and 3 in each of the regions of Sofia, Pleven, and Plovdiv. There were also 2 private dispensaries, 1 at Sofia and 1 at Plovdiv.

Sanatoria and Hospitals. During 1939 a total of 1,785 tuberculosis deaths was recorded in Bulgarian towns. Assuming a similar mortality rate in rural areas as in towns, the total annual number of deaths due to tuberculosis

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can be estimated at 9,000. Compared with this figure the hospitalization facilities (based on a minimum standard of one bed per death) are very inadequate. Bulgaria has 2 State sanatoria for pulmonary cases with 680 beds, 1 at Troyan and 1 at Iskretz (20 miles north of Sofia), and 3 private sanatoria with 143 beds, in addition to 9 State-owned climatic stations with a total of 300 beds. There are also 14 tuberculosis services at State first-class hospitals. Patients suffering from open tuberculosis can be admitted into second- and third-class hospitals. No single hospital, however, may devote more than half its total beds to such cases and the patients are not permitted to remain in the hospital for more than 3 months.

Further limitations to the hospitalization procedure had to be adopted in 1939 in view of the insufficient number of available beds.

There is one sanatorium for surgical cases founded in 1922 at Varna with a total of 320 beds.

Prevention and Social Work. In addition to the work of the Social Insurance Fund in the treatment and assistance to tuberculous workers, it is necessary to mention the efforts of the Society for the Prevention of Tuberculosis, responsible for the organization of the first tuberculosis dispensary at Sofia.

According to the Public Health Law a welfare committee should be organized in connection with each tuberculosis dispensary. The duties of these local committees include the collecting of funds and distributing of assistance to needy patients, payment of hospitalization, and procurement of suitable work for the tuberculous patients and their families.

Malaria

General. Malaria is one of the most important diseases in Bulgaria, where at times, due to it, whole villages have had to be abandoned.

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Bulgaria is situated in the temperate zone; its winters on the whole are severe, with rain or sometimes snow; its summers are dry and hot.

The distribution of malaria in Bulgaria is, as always, intimately related to the climatic and meteorological conditions of the country, which has five areas in which malaria is prevalent:

1. The Black Sea Coast
2. The Danube Basin
3. The Tundza Basin
4. The Maritza Basin
5. The Struma and Mesta Basin

The Black Sea Coast has long, cool springs and rather hot summers. The malarious regions here are Varna, Burgas, Sredetzl, Karabunar, and Aitos.

The Danube Basin has short springs and autumns. The summers are long, cool in the beginning and towards autumn, but very hot in between. Vidin, Lom, Svishtov, and Ruse are the malarious regions.

The Tundza and Maritza Basins have cool springs with very warm summers; the autumn also is generally warm. The regions involved here are for the Tundza Basin: Yambol and Elhovo, and for the Maritza Basin: Harmanli, Plovdiv, and Pazardzik.

The Struma and Mesta Basin has a great seasonal amplitude with very hot summers and very cold winters. Gorna Dzumaya is the malarious region.

Anopheline Fauna. Much research is still needed for the accurate determination of the malaria carrier in the whole of Bulgaria. The work has been done chiefly from the Rockefeller Station under P. K. Collins in Petrich and from the Burgas Malaria Institute under Danilevsky.

A. maculipennis, the predominant species constituting over 90 per cent of anophelines in Bulgaria, is found almost everywhere in this country up to an altitude of 1,300 meters (4,265 feet). No separation has been made until lately of maculipennis and elutus, but it is known (Martini, Sofia, 1926) that large

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numbers of *elutus* are found in Bulgaria. The principal type of breeding place of *A. maculipennis* is the marsh and swamp but they also breed in the rice fields. The larvae grow best in somewhat shaded spots where the water is still and clear. The adult will, on the whole, prefer stables to human habitations, and it seems that hibernation takes place here.

With the first warmth of spring the hibernating female will lay her eggs. The first generation will be ready in April or the beginning of May; the second generation, in August; and the third, in middle September and early October. Under particularly favorable conditions, a fourth generation may be developed.

Much work is needed in respect to the *maculipennis* races, the geographical ranges of which are unknown in Bulgaria.

A. superpictus represents about 6 per cent of the Bulgarian malaria carriers. It has been found to be particularly common in southwestern Bulgaria (Petrich, Gorna Dzumaya) in Harmanli, Plovdiv, Aitos, Burgas, and Yambol. It is rarely found above an altitude of 800 meters (2,625 feet). It is essentially a stream breeder and has been found wherever a stream affords the formation of eddies or small side pools. The water in such places is usually somewhat cooler than in the marsh or rice field. Shade is not essential and it will, for instance, often be found in the Strumitza in places where there are no protecting reefs.

In the late summer, *superpictus* increases while *maculipennis* decreases. (First generation, May; second, August and September; third, late October.) It was found to be particularly common in Gorna Dzumaya in the rice fields.

A. pseudopictus constitutes about 2 per cent of the malaria carriers in Bulgaria. Its habits closely approximate those of *maculipennis*. It is chiefly found in marshes and rice fields.

A. bifurcatus is so rarely observed that statements as to habitat are

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Experimental evidence has suggested that up to 5 per cent of the mosquitoes in human habitations are infected (studies from two regions since 1923).

Statistical Data. Mortality for the country as a whole is, as measured by official figures, not very high. In 1939, only 59 deaths due to malaria were reported in urban areas and 97 deaths in the rural districts. The greatest number of deaths were among rural children 1 to 9 years of age.

The fact that malaria is frequently mentioned as one of the reasons for the large mortality of the infant and child population makes it likely that the mortality figures are too low. Morbidity figures are not available for the country as a whole, as malaria is not a reportable disease. The first attempt at getting an idea of the malaria morbidity was made by Moloff, who used the figures of the Alexandrovskia hospital in Sofia, where it was found that 7 per cent of the patients were suffering from malaria (1907-1908). With the passage of the Malaria Law of 1919 some statistical information became available with regard to diagnosed malaria:

Year	Number Positive	Tertian	Subtertian	Quartan	Mixed
1922	10,899	8,664	1,980		255
1923	26,649	15,237	10,889	193	330
1924	36,493	24,662	11,169	407	225
1925	28,140	20,760	6,793	392	195
1926	35,891	24,845	10,357	342	347
1927	40,687	28,238	11,468	639	342
1928	52,681	34,670	16,458	1,140	413
1929	75,213	55,374	18,672	870	297

Of 306,653 cases in eight years, 212,450, or 69.3 per cent, were tertian malaria; 87,786 were subtertian (28.6 per cent); 3,983 were quartan (1.3 per cent); and 2,434 were mixed forms (0.8 per cent). That is to say, there was 2.4 times as much tertian malaria as subtertian.

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Some care should be taken in interpreting spleen indices in Bulgaria. The same method was not always used in the measurement from year to year nor from one geographical region to another. However, a rough idea of the incidence of malaria may be gathered from the following spleen indices measured on school children under 15 years of age:

Year	Number Examined	Positive	Spleen Index
1922	27,252	8,796	32.3
1923	25,573	7,706	30.1
1924	21,697	6,305	29.1
1925	33,330	10,203	30.6
1926	34,612	10,425	30.1
1927	66,703	18,286	27.4
1928	68,939	18,546	26.9
1929	83,637	21,341	25.5

In eight years 361,743 students were examined; 101,608 were positive, giving a mean splenic index of 28.09. The amplitude of splenic indices from one geographical region to another in Bulgaria is enormous (2.7-100 per cent). It is interesting to note the decline in the index from 1927 when government work in malaria was intensified.

The splenic indices (1934) for the most malarious districts in Bulgaria is shown on Map 5 and Table 4. This map clearly indicates malaria as a problem of the river valleys and the coastal zone.

Regional Problems. The Black Sea Basin was one of the areas first dealt with on a larger scale. In the beginning of 1927, when arrangements for the re-settlement of Macedonian refugees were being made, it became necessary to settle 30,000 families in the Burgas area. With the help of the League of Nations a quinization program was started, conducted from the Malaria Institute in Burgas.

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This program stopped, however, the following year, and the activities of the Institute seem to have been limited from that time to research and to the training of specialized personnel. Although this region (Burgas) contains some of the best agricultural land in Bulgaria, we find that the density of population is on an average not much over 70 to 80 per square mile, while the figure for the whole of Bulgaria is about 150 per square mile. Mortality for the whole of Bulgaria was, in 1933, 23 per 1,000, while for Burgas it was 43 per 1,000. Families are found to contain fewer children in this region than in other parts of the country. This is not due to a decrease in the birth rate, but to a large mortality among children. Manoloff speaks about a "malariatype" among the peasants of Burgas.

The Struma and Mesta Basin is perhaps the most malarious region in Bulgaria. Malaria is found here particularly along the Struma and Mesta Rivers which are separated by the Pirin Mountains. Of particular importance here are the Petrich plain and the Nevrokop and Gorna Dzumaya plains. The large number of lakes on the highland are on the whole at an altitude which makes them immune from malaria.

The climate in this part of Bulgaria is mild in the valleys, while the highland has a great climatic range, with hot summers and cold winters. From 200-600 meters (656-1,970 feet) we find that there are only two seasons: the rainy season, from October to April; and the dry season, from May to September. Until World War I this region was entirely dominated by the Turks. Malaria was, and often still is, called by the Turkish name "treska." The disease was believed to be due to "bad climate," and no measures were taken by the Turkish authorities, who even encouraged rice cultivation. Nor was anything done long after the partition of Macedonia. This region had been one of the great medical-military problems during the war. As military interest was concentrated here, the problem grew out of hand. It was found that quinine prophylaxis alone could not be relied

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on to keep the army free from malaria, and the German medical advisers instituted campaigns for killing adult mosquitoes near human habitations. The intense malarization of the younger population of this region during the campaign had a profound influence on the epidemiology of this disease after the war. "Carriers" brought malaria to small isolated villages in the mountains, which up to now had been entirely free of the infection. A permanent commission was established in Petrich with secondary centers in Gorna Dzumaya, Sveti Vrach, and Nevrokop, each under a specially trained person.

The region is rich in forests, and communications are on the whole poorly developed. There is, for instance, no railroad along the Mesta. A great deal of deforestation had taken place under the Turks, partly due to need for pasturages and partly due to avoidable forest fires.

The amount of arable land is small, and those who have none live by raising cattle. The cows are inferior, giving very little milk and meat, while the buffalo is a more satisfactory animal. Buffalo bathing places are often breeding places for anophelines. Sheep are particularly common in the Mesta valley.

There has been a continuous depopulation of this area through wars. The population is largely rural, and the families are fairly large - an average of five children per family - but the infantile mortality is high (about 280 per 1,000).

The housing is very primitive and not well adapted to protect the inhabitants against the anophelines. Particularly dangerous is the proximity of stables to living quarters. Sanitation is almost nonexistent in smaller places, soiled water being thrown directly into the street. Water for drinking and other purposes is often difficult to obtain, particularly in the Gorna Dzumaya region. Water reservoirs, where present, are often breeding places for anophelines, and malaria may thus be found far from the rivers. Owing to the mountainous character

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of the Petrich district only a small proportion of its total area is cultivable and this arable land is precisely the seat of the worst endemic malaria.

Of the total area of 1,680,000 acres, only 106,000 were under cultivation in 1923 and about 136,000 acres in 1927.

In 1927 the Rockefeller Foundation, after a preliminary discussion with the Bulgarian Government and with the experts of the League of Nations Malaria Committee, chose the Petrich area for an experimental malaria station. Petrich seemed to be one of the most heavily infected areas, and it was thought that a study of this region would be particularly valuable. Originally, the study was to be purely on a research basis for the first three years. Seven villages were chosen, and it was hoped that in a later stage the health authorities and the Rockefeller Foundation would be able to work together on the control. The ultimate development of the entire program was to be the establishment of a generalized public health organization to serve the Petrich district.

In 1928, at the request of the Bulgarian Government, the station, under Dr. Collins, took up a quininization program for 24 villages. In the years from 1928-1937, when the Foundation gave the management of the station over to the Bulgarian Government, a very thorough survey was made of the malaria situation. Anti-malarial measures were undertaken, both for experimental and practical purposes. An investigation into the malarial problem of rice fields was interrupted by government orders reducing rice growing in this malarious region. With the help of local trudovacs (enlisted labor, see p. 11) larger drainage works were undertaken, and in the last years an extensive control program was carried out on the Strumitza with trudovacs under the technical advice of the Rockefeller Foundation's Malarial Engineer, Mr. Knipe. In 1937, it seemed that there could be little doubt that improved health was reflected in the increase in the birth rate and in a moderate lowering of the death rate among the villagers in the

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controlled area since 1928. It was felt that the reduction in the severity of malaria could be credited with part of this improvement, but that the factor of an improved communal economy also played a role. Housing and sanitation had been considerably improved.

At the time that the station was turned over to the Bulgarian Government in 1937, little progress had been made in making Petrich the center for a general public health program, which had been the intention. Unfortunately, unqualified personnel soon took over, and this was reflected by a rise in the spleen rates the following year. The Rockefeller Foundation had calculated a minimum maintenance cost at 500,000 leva, and warned the government that any attempt to go under this amount would result in increased morbidity. An annual tax of about 74 leva per acre on reclaimed land drained by the malaria service would amply cover this.

The Maritza and Tundza Valleys are an important malaria region. The problem here is the rice fields and the large number of swamps. In 1930, the Rockefeller Foundation undertook a study of the rice fields and their role in malaria, as it appeared that in Plovdiv the rice fields were the primary source of anopheline breeding. It was, however, soon found that although the rice fields were an important source, they were by no means the only one. Attempts at getting the peasants to cooperate in the experiments with intermittent irrigation were not very successful, even though the Rice Field Commission was willing to lend its support. In 1934, the conclusion was reached that, for technical reasons, intermittent irrigation would not be the method of choice in this region (too little slope and cultivation in too deep water). It was the intention to work out some other method, but this was not realized.

The Danube Basin suffers particularly from malaria early in the year, due to the inundations of the surrounding country. These inundations leave swamps, which have a very large anopheline population.

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Blackwater Fever. There is a definite geographical difference in the severity of the clinical forms of malaria in Bulgaria. Burgas and Petrich usually have the severest forms. There is a correlation between the presence of superpictus and the occurrence of subtertian malaria. Particularly severe epidemics raged in Burgas in 1923-1924 and 1932, and in Petrich in 1928-1929. Several cases of blackwater fever occurred during these epidemics.

Administration of Malaria Campaign. A Malaria Inspectorate was formed under the Malaria Law of 1919, as part of the Directorate of Public Health, but with a budget separate from that of the general sanitary service. All anti-malarial work was to be conducted by personnel belonging especially to this Inspectorate, and the work was not carried on through the ordinary health departments. Certain regions were, on the advice of the Malaria Inspectorate, declared to be "malarious" by the General Medical Council. In each of these regions an inspector with special training in malariology was to conduct the campaign, reporting to the Inspectorate. In 1921 there were 4 regions, but in 1928 the number of regions had increased to 13, with 638 villages and 794,187 inhabitants, a total area of 8,824 square miles. The Petrich district was not made a "malarious" region, but constituted a special research area.

About 1931, as mentioned in K. Markoff's Report for 1933, the Malaria Inspectorate was abolished for economic reasons and the work was taken over by the local public health services. Markoff points out that only rarely will the district medical officer have the necessary training for this specialized work. New district medical officers must now serve for a period at one of the three malaria stations - Petrich, Plovdiv, or Burgas - and both regional and district medical officers must spend at least four days in one of the centers at Vidin, Ruse, Varna, Plovdiv, Petrich, and Burgas.

In the spring of 1940, four-day courses for malaria control personnel

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were given at the malaria stations of Burgas, Vidin, Plovdiv, Svishtov, and Petrich and at the district health centers of Yambol, Gorna Dzumaya, Ruse', and Varna.

References:

Gavriloff, B.: La lutte anti-paludéenne en Bulgarie et son Organisation. Thèse, Paris, 1930.

Beynoff, S.: Malaria in Bulgarien. Inaugural-Dissertation, Hygienisches Institut der Universitaet Leipzig, 1933.

Markoff, K.: Malaria in Bulgaria in 1928. Izvestija Dir. Nar. Zdrave, 1930, vol. 15, pp. 86-120. Malaria Conference in Burgas, September, 1929 (in Bulgarian).

Markoff, K.: Rapport sur la Malaria en Bulgarie pour l'année 1933. Bull. de l'Off. Int. d'Hyg. Pub., 1935, vol. 27, pp. 338-339.

Popoff, D. J.: Introduction a l'Etude du Paludisme en Macedoine orientale. Strasbourg Medical, 1932, Nos. 19 and 20.

Venereal Diseases

Syphilis has existed in Bulgaria in an endemic form for over a century. As a result of treatment given in hospitals and dispensaries, the number of cases was decreasing even before World War I. A more intensive campaign was organized after the war, following technical advice supplied by an expert of the Health Organisation of the League of Nations. During World War I and the years following the defeat of Bulgaria, venereal diseases spread considerably; 14 per cent of the Bulgarian soldiers suffered at that time from syphilis and 21 per cent from gonorrhea. Many of these soldiers were demobilized and sent home without treatment, thus spreading the disease throughout the country.

Since 1920, the registration of syphilis cases has been compulsory but only a small fraction of these come to the notice of medical officers. In 1923, for instance, 3,393 cases were registered, a total considered to be only a fraction of the actual cases, and of these only 1,366 were treated in hospitals

during the year.

The Venereal Diseases Law introduced in 1936, if properly applied, would contribute substantially to the improvement of the situation. The Law provides for free treatment of all venereal disease patients (suffering from syphilis, gonorrhea, and soft chancre) with special procedure for case-finding and tracing of the sources of infection, secrecy of the treatment, and enlightening of syphilitic patients regarding the nature of the disease. The Law also provides for prenuptial medical examinations and the prohibition of public houses.

The Venereal Diseases Committee was set up by the Law, its duties including the study of all aspects of the problem and anti-venereal propaganda. The Committee includes representatives of the Directorate General of Public Health, the Dermatological Clinic of the University and State hospital, of the medical profession of the Social Insurance Fund, and representatives of judicial and police authorities.

In 1939, there were 10 government dispensaries, 3 in the Sofia region, 2 each in the Pleven and Burgas regions, and 1 in the towns of Vratza, Plovdiv, and Shumen, respectively. There was also 1 private dispensary at Plovdiv. Twelve of the 20 first-class hospitals in 1939 had special venereal disease sections.

In an effort to bring medical assistance by specialists to rural areas, 2 traveling dispensaries were set up in the Shumen and Burgas areas, chiefly engaged in combating endemic syphilis and other venereal diseases.

In 1939, about 9,000 patients were treated in the venereal disease sections of hospitals and some 3,700 at the dispensaries.

Reference:

Venereal Diseases Law: Izveztija Glav. Dir. Nar. Zdrave, December 25, 1936, vol. 21 (in Bulgarian).

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Trachoma

There are reasons to believe that trachoma is considerably more common than is indicated from the official records, which in 1940 showed less than 5 cases per month. Although trachoma is a notifiable disease, only a small proportion of the cases are recorded (338 in 1936 and 30 in 1938) and few of the patients seek treatment at dispensaries. The disease is common among school children. According to an older survey (1906), some 20 to 25 per cent of the school children in two villages were suffering from trachoma. Sofia has an ophthalmic clinic and there are ophthalmic wards in the first-class hospitals at Varna, Ruse, Plovdiv, and Pleven. The wards are not very large and most patients leave before the termination of their treatment and rarely report at the dispensaries for continuation of the treatment.

Leprosy

Leprosy is not common in Bulgaria. From 1930 to 1940 only 7 cases were diagnosed. Of these, 5 were suffering from tubercular forms, while the remaining 2 were mixed forms. With the exception of 1 case, which was infected in Russia, they all seem to have contracted the disease in Bulgaria. The few patients still alive in 1941 were isolated at the dermatological division of the Alexandrovskia hospital in Sofia.

Reference:

Gehr, E.: Die Lepra in den Balkanlaendern. Deutsche tropenmed. Zeitschr., 1941, vol. 45, pp. 385-405.

ACUTE INFECTIOUS DISEASES

Plague was apparently unknown in Bulgaria until 1924 when two cases, imported by ship from Syria, were reported at Varna. Examinations carried out occasionally at Varna have not disclosed any presence of plague in rats and their fleas.

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Rabies

Rabies is endemic in Bulgaria among domestic and wild animals. After World War I the disease assumed the character of an epizootic and the number of persons bitten has been increasing steadily during the postwar years. The number of persons treated rose from an annual average of 3,400 in 1921-1930 to 4,526 in 1931 and 6,862 in 1934.

In 1937 a total of 5,196 persons (of which 2 died) were treated at the Bulgarian institutes: 3,001 by Boecker's vaccine (90 mgs., 20 days' treatment) and 2,195 persons by the Högye's method and, in severe cases, with Alivisatos vaccine (325-3,700 mgs., 13-15 days).

Anti-rabic vaccine is being prepared at the Sofia Institute of Public Health and in the laboratories at Tirnovo and Varna. In 1939 there were 15 stations for treatment - 3 each in the regions of Sofia and Plovdiv; 2, respectively, in the regions of Vratza, Pleven, Stara-Zagora, and Shumen; and 1 in the Burgas region.

In 1937 a total of 15 deaths due to rabies were reported in Bulgaria.

Cholera. The presence of cholera was reported in Bulgaria during the Balkan Wars (1911-1913). During World War I, when the disease was present in the Austro-Hungarian Armies and the Russian Army, many cases were reported among Bulgarian soldiers occupying the Dobrudja (see Map 2). From the middle of October to the end of December, 1916, 8,456 cases, of which 116 were fatal, were treated in the Bulgarian field hospitals in the Dobrudja. Since 1917 no evidence of the disease was recorded in Bulgaria.

Smallpox. Only 71 cases of smallpox (with 14 deaths) occurred in the country from 1921 to 1924, and since 1925 no further cases were reported. The

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number of persons vaccinated and revaccinated during the period 1926-1934 included 87 to 92 per cent of all persons required by law to be vaccinated or revaccinated.

Relapsing Fever. Louse-borne relapsing fever occurred in Bulgaria during World War I among Serbian soldiers from Macedonia, and later among the Russian refugees. Only 1 case was reported in 1924 and none since that year.

Typhus Fever. Epidemic louse-borne typhus is said to have appeared in Bulgaria in 1914 during World War I but the disease only assumed epidemic proportions among the civilian population in 1917 when the morbidity reached 133 per 100,000 population. A total of 1,175 cases (161 deaths) was reported over the period 1914-1916; 19,829 cases (2,386 deaths) from 1917 to 1920; an average annual number of 364 cases from 1921 to 1923; and 183 cases from 1931 to 1940. The apparent case-fatality rate was about 12 per cent over the periods 1916-1920 and 1921-1930; and about 11.3 per cent from 1931-1940. It should be noted, however, that while the earlier figures refer to reports of typical cases of historical typhus, recent reports include many mild cases diagnosed by Weil-Felix reaction.

While the disease has lost its epidemic character since 1922, and its incidence has decreased over the following years, the distribution of the endemio-sporadic cases throughout the country from 1931 to 1941 shows a wider dispersion of the infection than is seen in various areas of Yugoslavia and Rumania. In 1934, for instance, 285 cases were reported in Bulgaria from 79 localities, i.e., in 41 localities with only 1 case; 32 localities with 2 to 9 cases; and in 6 localities with 11 to 30 cases. The origin of many of the local foci, involving a small number of cases, was often traced to nomadic Gypsies. The Gypsies, as well as the Pomaks and Turkish communities, account for a large proportion of cases, and the vermin infestation seems to be much higher among them than among

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the Bulgarian peasants. During recent years many mild cases were discovered by serological examinations of blood among members of communities where a clinical case had been reported.

Recent preventive measures taken by the public health authorities include (1) delousing campaigns in the Moslem communities, organized with the cooperation of the Moslem religious authorities (July 26, 1940); (2) orders to the Institute of Public Health and to all public health laboratories and health services to report to the Director General of Public Health all cases of positive Weil-Felix reactions (January 29, 1941); and (3) compulsory registration and medical examination of all Gypsies, ambulant salesmen and craftsmen, and all others "who present danger of spreading lice and typhus infection." A special sanitary passport has been provided (November 14, 1941) for these migratory groups of the population.

Cerebrospinal Meningitis. The rise in the incidence of cerebrospinal meningitis observed in most countries of Europe since 1936 was also recorded in Bulgaria in 1938. While the average annual number of cases from 1921 to 1937 was about 27, the number rose to 204 in 1938, 669 in 1939, and reached 1,239 cases, or about 20 per 100,000 population, in 1940. The number of cases fell to 497 in 1941 and to 215 in 1942.

The apparent case-fatality rate was higher in Bulgaria than in the neighboring countries (reaching 60 per cent from 1921 to 1937). The rate fell from 51 per cent in 1937 to 43 per cent in 1938.

Most likely, the fatality has decreased further since 1938, as was the case in Yugoslavia and Hungary, where the decrease was due largely to the use of sulfanilamide compounds for treatment.

Typhoid Fever is, in Bulgaria, as in the neighboring countries of Southeastern Europe, an important cause of morbidity and mortality. Owing to

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the small number of physicians, only severe cases are likely to be reported in Bulgaria and, therefore, in spite of a satisfactory reporting of known cases, the morbidity data are not comparable with those of other countries. The available statistical data show that typhoid morbidity in Bulgaria was among the highest in Europe, reaching during the years 1931 to 1935, 97 per 100,000 population against 137 in Hungary, about 70 in Spain and Italy, and less than 55 reported cases per 100,000 population in Greece, Yugoslavia, and Rumania. In these last three countries the reporting of cases is very incomplete.

Since World War I the disease assumed epidemic proportions in Bulgaria in 1924, 1932, 1934, and 1936, when the morbidity rate was above 115 per 100,000 population, while the morbidity during the nonepidemic years, from 1921 to 1939, fluctuated between 40 and 70. In 1940 and 1941, however, the number of reported cases fell to about 23 per 100,000 population.

The typhoid mortality, as based on statistics of causes of death, was lower in Bulgaria than in Yugoslavia, Greece, and Hungary, amounting from 1931 to 1934 to about 9 in Bulgaria, 16 in Hungary, 19 in Greece, and 27 per 100,000 population in Yugoslavia. During the years 1920 to 1934 typhoid fever in Bulgaria occupied first place among causes of death from acute epidemic diseases in 1927, 1929, 1930, and 1932, and second place in 1924, 1928, and 1931.

The highest incidence of typhoid morbidity and mortality is recorded in Bulgaria in the Danube and Isker River valleys and in the Sofia district, and the lowest rates are reported in the Pirin and Rhodope Mountain districts and in the Maritza valley where, however, the reporting of cases is likely to be the least satisfactory. The morbidity data for 53 Bulgarian towns over the period 1923-1934 confirm these regional differences in distribution of the disease and show, further, higher incidence of typhoid fever in the smaller towns, especially in the Danube valley (see Map 6).

During recent years important measures were taken to improve the situation with regard to typhoid fever and water supply. These measures include a complete water supply census (1940) and compulsory immunization in villages with defective water supply. Immunization applied extensively in Bulgaria for many years, not only among troops but also in rural areas where epidemics occurred, is said to show some favorable results. An inquiry made in villages of the Varna district where some 147,000 persons were immunized from 1926 to 1934 shows that the majority of cases occurred among women and children who escaped immunization.

Reference:

Verbev, D.: Immunization Against Typhoid Fever. Izveztija Glav. Dir. Nar. Zdrave, February 1, 1941, vol. 25 (in Bulgarian).

Diphtheria. Diphtheria incidence in Bulgaria has increased sharply since 1930; while the average morbidity rate from 1921 to 1930 was about 30 per 100,000, it rose to 73 in 1933 and reached over 150 per 100,000 population from 1934 to 1937. The highest incidence was reached in 1936 with about 10,000 cases and the number of reported cases decreased from 1938 to 1942. The diphtheria mortality did not increase to the same extent as the morbidity; the rate rose from 4.4 in 1921-1930 to about 13 per 100,000 population during the years 1934 to 1936, but decreased to about 8 per 100,000 in 1938.

About 124,000 immunizations of children from 1 to 10 years of age with anatoxin were performed from 1931 to 1934. The immunization program of the public health authorities has not been carried out during recent years owing to the shortage of imported anatoxin.

Scarlet Fever. During the first quarter of the present century, scarlet fever was a very prevalent and severe disease in Bulgaria, but both the morbidity and mortality decreased considerably during the period 1924-1935. After World

War I a general recrudescence of the disease was reported in Southeastern Europe. While the maximum incidence was recorded in Rumania in 1921 and in Yugoslavia in 1922, an all-time record number of cases (15,000) was reported in Bulgaria in 1923, when the morbidity rate reached about 306 per 100,000 population and the mortality due to the disease reached 57.5 per 100,000. From 1924 to 1935 the incidence of scarlet fever decreased steadily, although the disease assumed an epidemic character in 1927 and 1932. During recent years, the morbidity increased again from about 60 per 100,000 in 1937 and 1938 to over 80 per 100,000 in 1939 and 1940. The mortality due to scarlet fever fell from 57.5 per 100,000 in 1923 to less than 2 per 100,000 from 1929 to 1935 but rose again to about 8 per 100,000 population in 1938. The apparent case-fatality rate which varied from 16 to 23 per cent over the period 1906 to 1924 fell as low as 3, even 2.5 per cent, from 1932 to 1935.

Dysentery (Bacillary). Between 1931 and 1934 some 500 cases of bacillary dysentery were reported annually; in 1935 and 1936 the number dropped to 200, but in 1937 it rose to nearly 2,000, giving an incidence rate of 31 per 100,000. The number of cases was about 1,500 in 1938 and 600 in 1940. The deaths rose from 50 in 1936 and an annual average of 89 in 1921-1935 to 288 in 1937 and 163 in 1938.

Shiga-Kruse bacillus is the predominating type in Bulgaria. The year 1937 was marked by epidemics in two towns. In the town of Svichtov, with 13,000 inhabitants, there were 506 cases recorded (and 57 deaths) with symptoms of dysentery, of which three-quarters occurred in the period June 21 to July 20. The cases were widespread and the available evidence points to an infection of the water supply. The Shiga-Kruse bacillus appeared to be the agent. In the town of Kustendil, with 16,000 inhabitants, there were 648 cases recorded, or nearly 4 per cent of the population. Nearly 90 per cent occurred in the period December

1 to December 20, with no deaths reported. Here the Flexner bacillus appeared to be the agent, and there was evidence that the water supply was responsible.

Energetic preventive measures against dysentery were taken by the health authorities in the spring of 1940. These measures included, among others, a search for carriers among persons who had suffered from the disease during the previous two years and among persons dealing with food or those in charge of the water supply.

Reference:

Radcoff, R.: Sur la dysenterie en Bulgarie. Bull. de l'Off. Int. d'Hyg. Pub. 1938, vol. 30, pp. 1807-1817.

Anthrax. Some 800 to 1,100 cases of anthrax in man and about 2,000 to 3,000 cases in animals are reported each year in Bulgaria; that is, 1 case of human disease to 3 cases in animals. There has been an important rise in the figures during the last decade (1928-1938), varying from 176 human cases in 1927 to the peak year 1934, with 1,111 cases. Owing to better reporting of cases, the case-fatality rate fell from 10.3 per cent in 1926 to 1930 to 6.5 per cent in 1934 to 1938.

A study was made of 521 cases occurring in man during the years 1922 to 1937. The highest incidence was found to occur from July to October. Infection was usually contracted from ill or dead animals, while the handling of leather, brushes, and other material of animal origin played a smaller part than in some other countries.

Of the 521 cases, 443 were among country people and 78 in town dwellers; 349 were men, 120 women, and 52 children, and there was a higher mortality among women.

The incidence varies considerably from one region to another, and the

Vidin, Vratza, and Plovdiv districts have a particularly high incidence.

Reference:

Koschucharoff, P.: Die Behandlung der menschlichen Milzbrandes in Bulgarien mit besondere Beruecksichtigung der Immunserumtherapie. Ztschr. f. Immunitaetsforsch. u. Exper. Therap., 1938, vol. 92, pp. 53-73.

Other Diseases

A few cases of undulant fever have been reported in Bulgaria, one of them with fatal ending (1933).

A case of rat-bite fever (Sodoku) was described in 1935, recovering after two months.

Trichiniasis is relatively common in the rural districts.

Kala-Azar. The first case of Kala-Azar was reported in Bulgaria in 1922. It was, however, imported from Volos or Larissa (Greece). A later case was reported (Mollow) from a village in the Nevrokop district, situated at 1,000 meters (3,300 feet) above sea level, on the left bank of the Mesta. In this village all dogs had previously been killed, due to rabies, and no phlebotomi were found. Phlebotomi were, however, found to be numerous in neighboring villages. A few cases of cutaneous leishmaniasis have been reported from the Black Sea coast.

Dermatitis due to Pediculoides ventricosus occurs widely in the warmer parts of Bulgaria where serious outbreaks have been noticed during and shortly after harvesting.

References:

Mollow, W.: Ueber einen auchtochtonen Fall von Kala-Azar in Bulgarien. Arch. f. Schiffs u. Tropenhyg., 1938, vol. 42, No. 7, pp. 307-.

Uroukoff, B.: Sur la dermatite causee par le Pediculoides ventricosus. Ann. Parasit. humaine et comparee, 1939, vol. 17, pp. 69-71.

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POISONOUS SNAKES

Out of the 28 species of snakes found in Europe, 15 are found in Bulgaria. Of these 15, 4 belonging to the viperinae (triangular heads) are poisonous: *Vipera ammodytes* L.; *Vipera berus* L.; *Vipera aspis* L.; and *Vipera ursini* Bonap. Bites are not rare in Bulgaria and deaths occur now and then. The first description of a death due to snake bite was made by Dobreff in 1936.

Reference:

Dobreff, M.: Ueber die Giftschlangen in Bulgarien. Arch. f. Schiff's u. Tropenhyg., 1936, vol. 40, p. 197.

NUTRITION

It is estimated by the Institute of Agriculture of Sofia from studies made in 1935-1936 that the average intake of the peasant is 3,400 calories, which is thought to be insufficient during heavy manual labor, such as harvesting.

The diet is usually very monotonous and consists chiefly of bread, the percentage of the total calories derived from flour being estimated at 72 per cent, from meat and fats 10 per cent, dairy products and eggs 6 per cent, vegetables 5 per cent, fruits 4 per cent, wine and spirits 2 per cent, and sugar and rice 1 per cent. The result is that 76.6 per cent of the proteins of the diet and 46.9 per cent of the fats are of vegetable origin.

According to a survey of the Institute of Agriculture on 936 farm households from different parts of the country, the average annual consumption of foodstuffs per head was as follows:

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	<u>Kilograms</u>		<u>Kilograms</u>
Flour (or Bread)	352.7	Preserved Meat	1.3
(or nearly 1 kg. per day)		Fish	0.5
Rice	2.7	Lard	4.8
Macaroni, etc.	0.3	Vegetable Oils	5.7
Sugar	2.0	Vegetables	109.3
Milk	67.6	Dried Vegetables	13.3
Cheese	9.5	Potatoes	17.5
Butter	1.1	Fruit	24.0
Eggs (number)	71	Grapes	70.7
Meat	21.9	Wine	39.9
Poultry	4.3	Brandy	1.5

Of these foods, only about 17 per cent (by value) were bought from the stores, while 83 per cent were home grown.

It will be seen from these figures that bread is by far the most important foodstuff in rural areas. The milk consumption estimated by various authorities at 50 or 67 liters per head per year (the total production per head being 100 liters), is higher than in many parts of the Balkans. A large part of the milk is drunk as sour milk or yoghurt. The meat consumption, although low, is again higher than in the neighboring countries. Meat is usually eaten twice a week. The yearly consumption of fresh vegetables (109.5) kilograms, of fresh fruits (24 kilograms), and grapes (70.7 kilograms) is relatively high; the potato consumption is unexpectedly low. Only 2 kilograms of sugar are consumed per year per head, the price of sugar being very high owing to a 70 per cent government tax.

The relative amounts of cereals eaten in the whole of Bulgaria were according to a recent survey) as follows: wheat flour, 74 per cent; rye flour, 8 per cent; and maize flour, 18 per cent. In the mountainous provinces of Sofia and of Plovdiv there is a higher consumption of rye than in other provinces; in the provinces of Burgas, Stara-Zagora, and Shumen, the proportion of wheat flour consumed is 90 per cent of the total cereals, while in the Vratza and Pleven

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provinces (in the northwestern part of the country) more maize is eaten than in other provinces. It is estimated that 80 to 90 per cent of the city people eat white bread, and the rest of the city population eat the cheaper brown bread. In rural areas the bread is mostly brown or whole-meal wheat bread, but in many districts bread contains a mixture of wheat and rye or other flours. Where maize is the principal cereal food, it is eaten as bread - not in the form of polenta - as in Rumania.

Since 1934 the government has had a monopoly on all cereals. The Directorate for the Purchase and Export of Cereals, which fixes the prices, has also established large granaries throughout the country. In the case of a bad harvest the peasant could (before the present war) receive help in the form of cereals through the Agricultural and Cooperative Bank or through the Public Calamities Fund.

In general, it seems that the Bulgarian peasants' diet may be adequate in spite of the very high proportion of bread which it contains, and the general dietary is much richer in vegetables than is the case in other Balkan countries. It has been observed that in the villages on the frontier of Bulgaria and Rumania, the Rumanian population often develops pellagra, while the Bulgarians in the same villages, with the same maize basis of the diet, do not succumb presumably because they grow and eat more vegetables.

References:

League of Nations: European Conference on Rural Life. RURAL DIETARIES IN EUROPE. Geneva, 1939.

Mocheva, Christina: The Bulgarian Village Agricultural Household During 1935-1936. Sofia, 1938.

PRIVATE ORGANIZATIONS

Bulgarian Red Cross Society
Bulgarian Child Welfare Union
Bulgarian Anti-tuberculosis League
Rockefeller Institute
Near East Foundation

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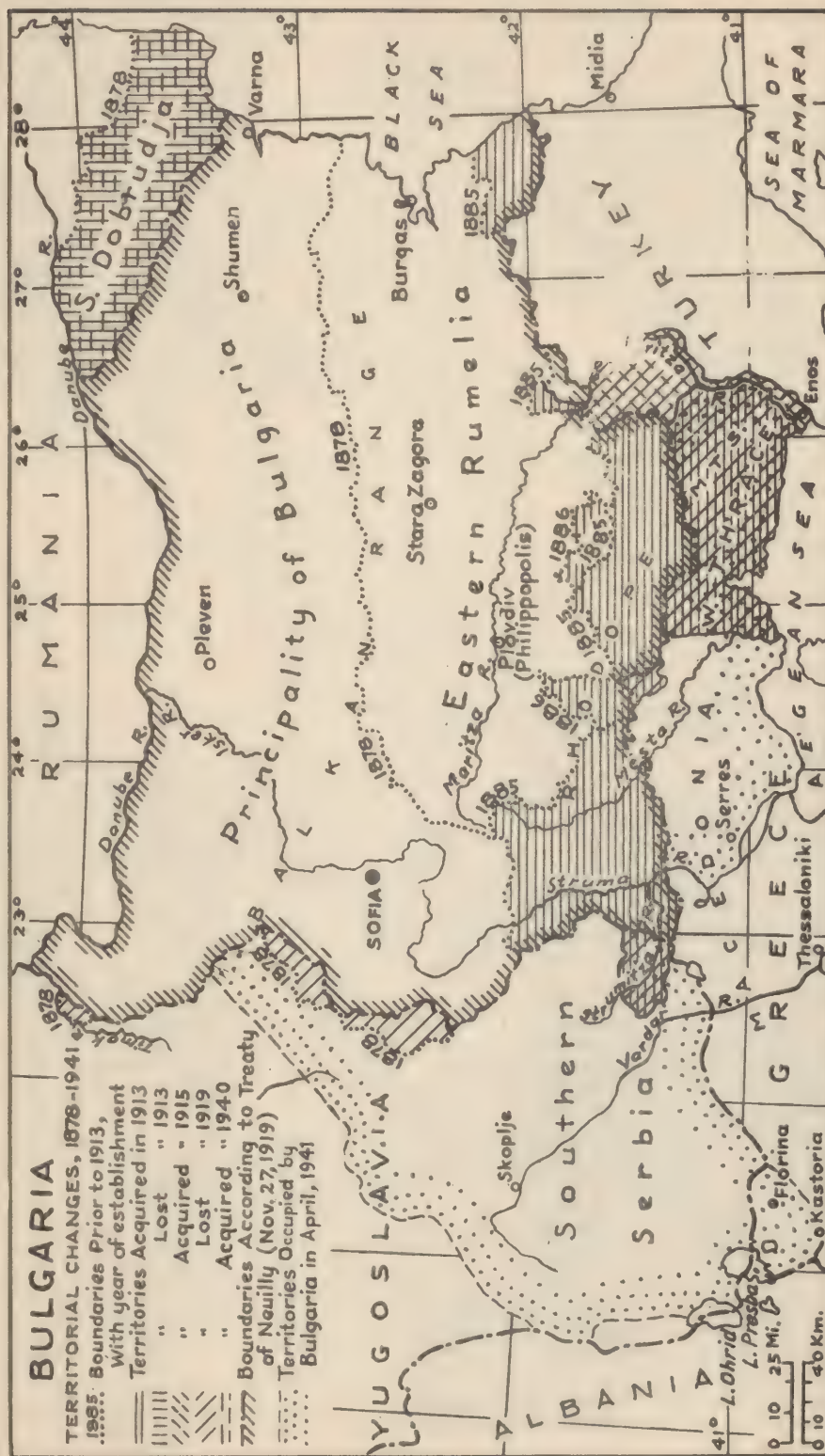
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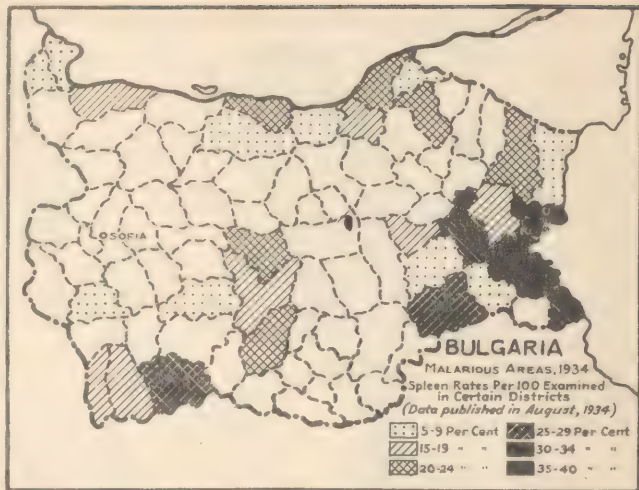
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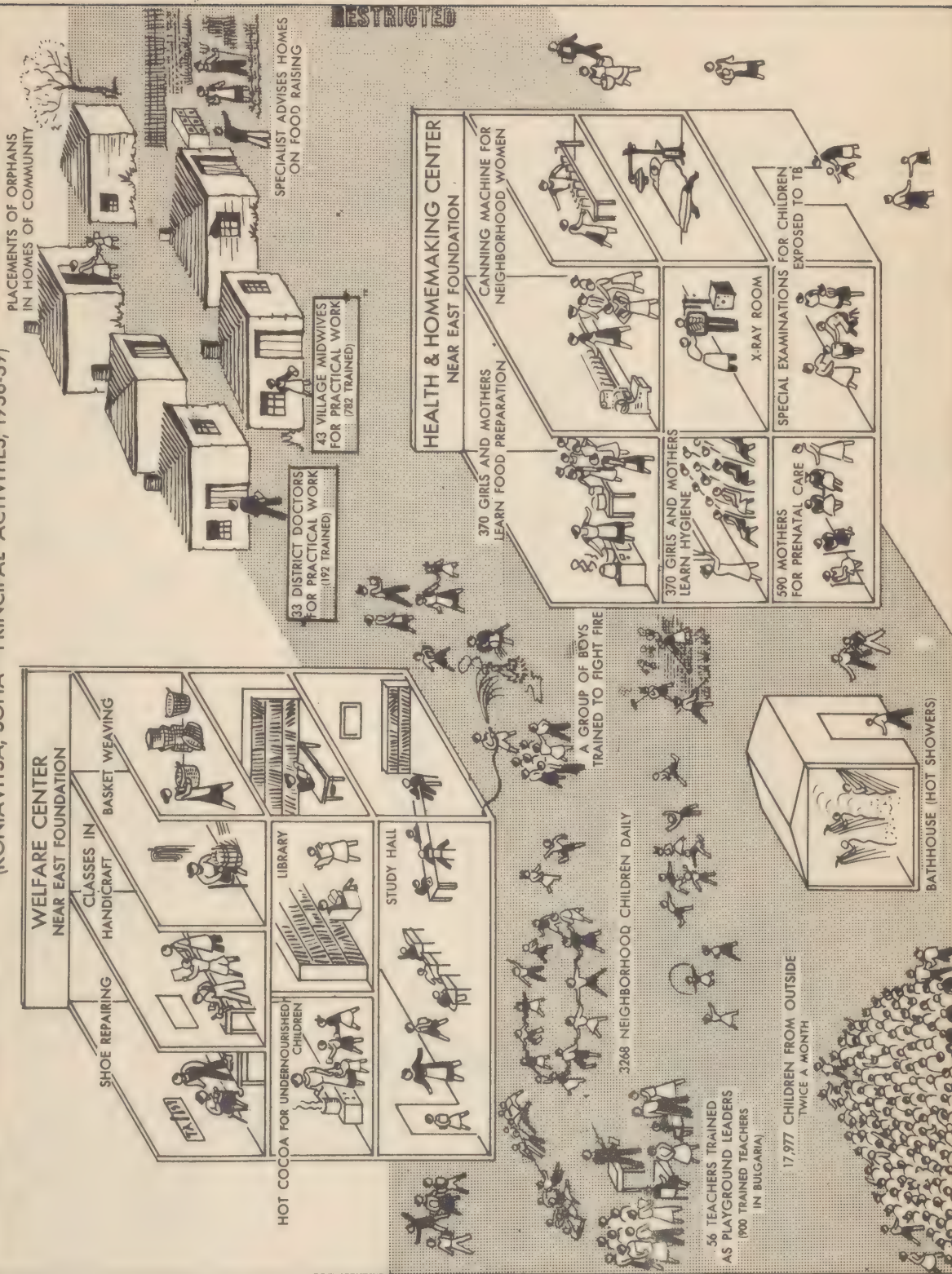
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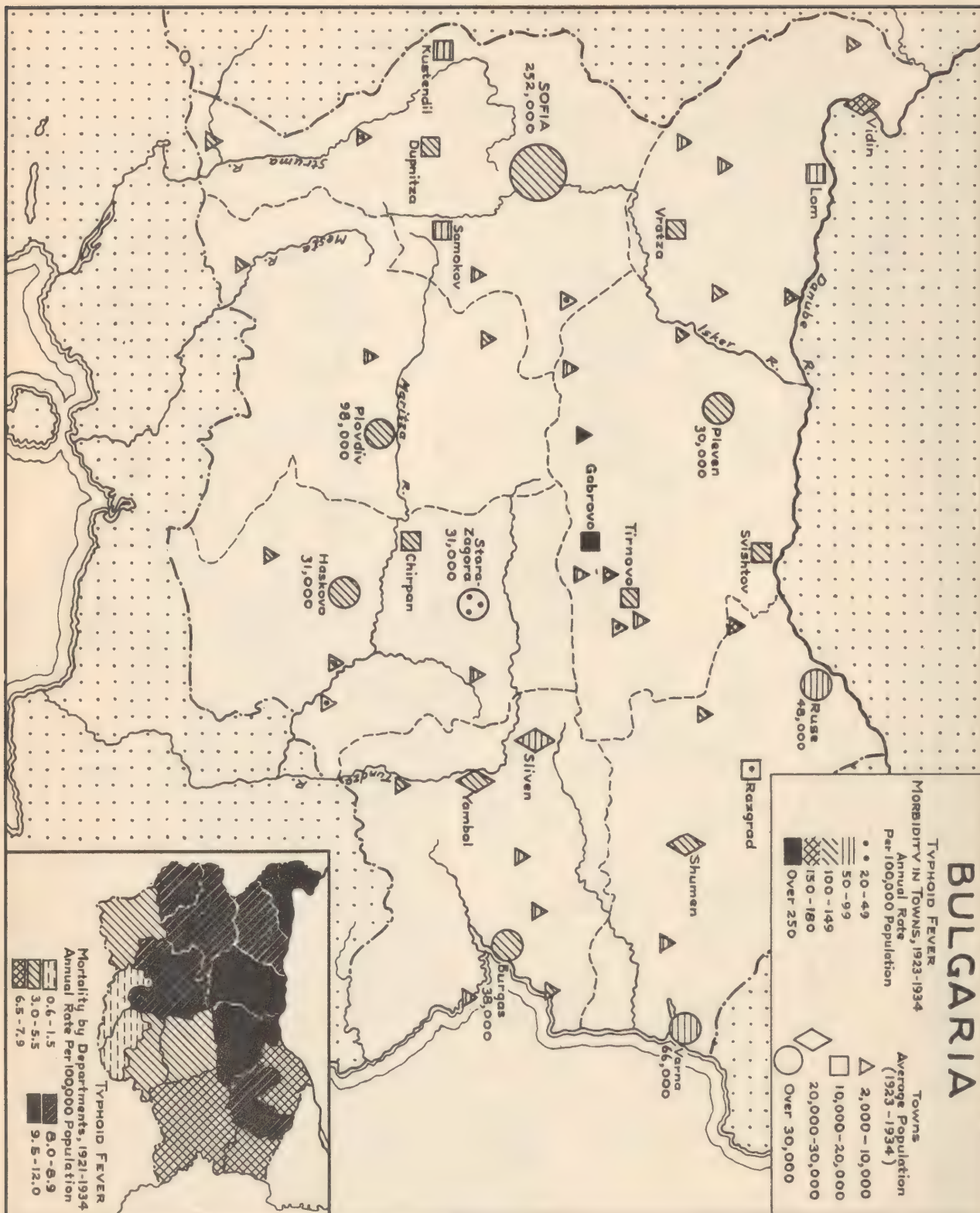
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A NEAR EAST FOUNDATION HEALTH AND TRAINING PROJECT

(KONIAVITSA, SOFIA—PRINCIPAL ACTIVITIES, 1938-39)



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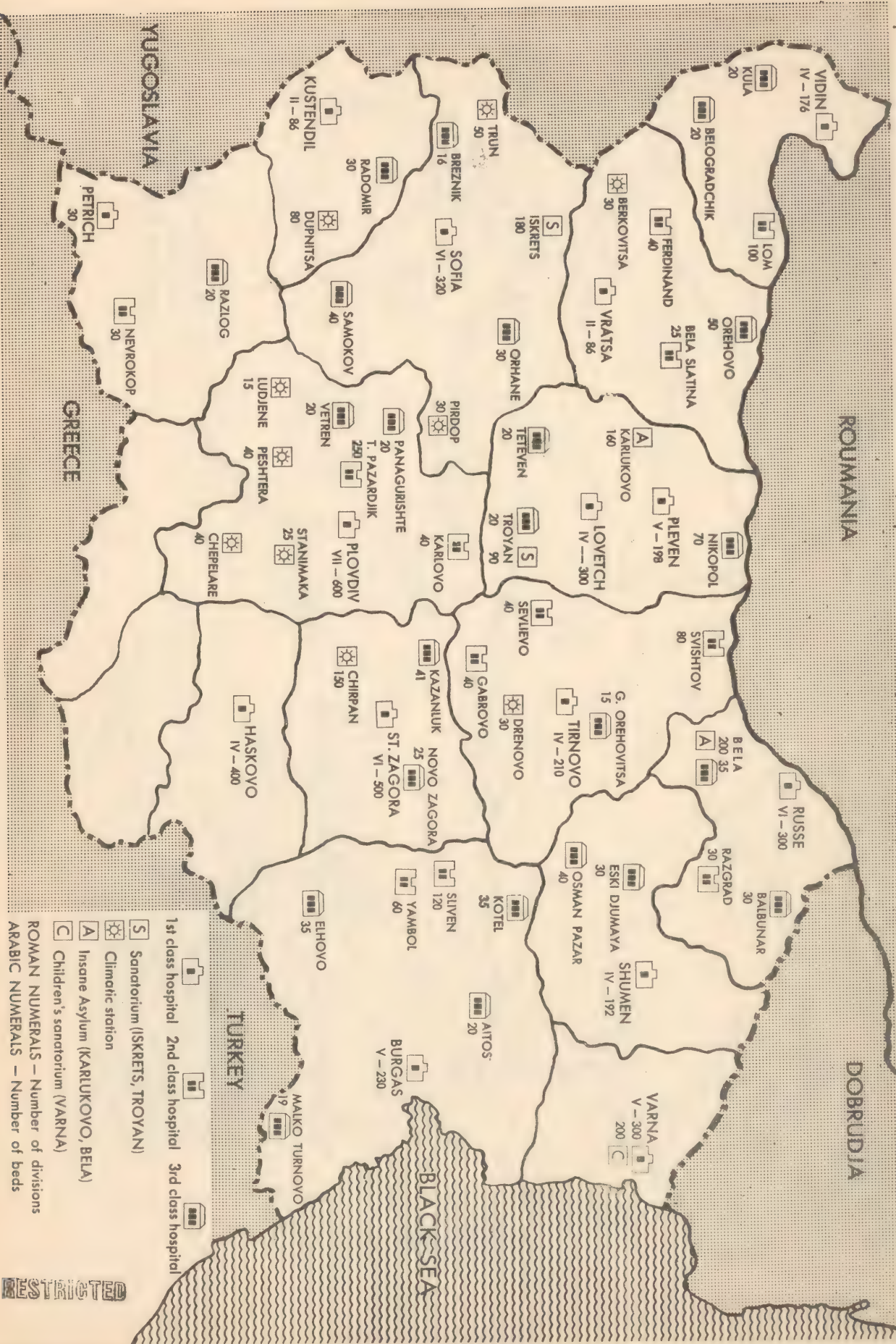




BULGARIA: PRINCIPAL MALARIOUS AREAS

DISTRIBUTION OF STATE HOSPITALS IN BULGARIA—1930

(Simplified from Annual Report — P. H. Directorate)



APPENDIX B - TABLES

Table 1. Hospitals, 1939

Regions	State					Communal		Total (Excluding Mental Hospitals)	Population, Census December 31, 1934 (Thousands)	Inhabitants Per Hos- pital (Excluding Mental Hospitals)	Hospital Beds Per 1,000 Population (Including Mental Hospitals)
	General		Specialized		General	Private					
	First Class	Second Class	Third Class	Specialized							
				Maternity			Mental				
Burgas	H. B. 2 355	2 110	3 70					6 160	554.9	42,688	1.25
Vratza	H. B. 2 337	4 280	3 40					14 240	739.4	32,146	1.21
Plovdiv	H. B. 2 850	3 140	3 65					7 315	801.8	53,450	1.71
Pleven	H. B. 4 980	2 150	6 120		1 300			20 325	996.7	31,146	1.88
Sofia	H. B. 4* 1,485	3 200	3 75	1 150				26 950	1,152.0	31,137	2.48
S.-Zagora	H. B. 3 900	2 100	2 35					12 180	812.6	42,770	1.50
Shumen	H. B. 3 990	1 100	4 80		1 400	2 60		9 100	1,020.5	53,710	1.70
Total	H. B. 20 5,897	17 1,080	24 485	1 150	2 700	2 60		94 2,270	6,077.9	38,468	1.75
In Towns	H. B. 20 5,897	16 1,040	21 450	1 150	1 400	2 60		89 2,155			

H. - Hospitals; B. - Beds.

*Including the University Hospital "Alexandrovska."

Table 2. Medical Personnel in Bulgaria, 1939.

A. Physicians and Feldshers										
Region	Number of Physicians					Number of Inhabitants Per Physician		Number of Feldshers		
	State Service	Communal Service	Private Practice	Total	Per 10,000 Population			State Service	Communal Service	Private Practice
	Burgas	121	21	79	221	4.0	2,511	36	23	41
Vratza	148	16	74	238	3.2	3,107	42	24	87	153
Plovdiv	208	33	132	373	4.6	2,151	42	26	101	169
Pleven	235	31	109	375	3.8	2,660	60	18	88	166
Sofia	590	66	610	1,266	11.0	910	57	29	164	250
S.-Zagora	174	28	93	295	3.6	2,755	43	19	72	134
Shumen	210	24	125	359	3.5	2,841	75	28	115	218
Total In Towns	1,686	219	1,222	3,127	4.9	2,033	355	167	668	1,190
	1,169	185	1,123	2,477			50	111	384	550

B. Nurses and Midwives

	Nurses				Midwives			
	State Service	Communal Service	Private Practice	Total	State Service	Communal Service	Private Practice	Total
Burgas	15	2	5	22	15	43	38	96
Vratza	6	1	8	15	20	32	37	89
Plovdiv	23	6	9	38	24	41	38	103
Pleven	19	-	8	27	36	53	70	159
Sofia	150	29	121	300	45	29	160	234
S.-Zagora	13	1	11	25	19	27	52	98
Shumen	22	5	8	35	28	37	74	139
Total	248	44	170	462	187	262	469	918
In Towns	241	44	161	446	54	53	399	506

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Table 3. Public Health Services, Bulgaria; Distribution by Regions, January, 1939.

	Regions							Total	In Towns
	Burgas	Vratza	Plovdiv	Pleven	Sofia	S.-Zagora	Shumen		
Regional Medical Officers	1	1	1	1	1	1	1	7	7
District Medical Officers	10	9	11	13	15	13	13	84	81
Subdistrict* Health Services:									
Under a Physician	51	77	76	115	85	63	76	543	7
Under a Feldsher	31	38	31	49	47	39	66	301	-
Communal Health Services:									
Under a Physician	23	16	33	35	63	24	28	222	191
Under a Feldsher	23	24	26	18	29	19	28	167	111
Municipal School Physicians	5	6	11	4	13	5	3	47	45
Laboratories:									
State	1	2	1	2	2	1	1	10	10
Municipal	1	1	-	-	1	1	2	6	6
Anti-Rabies Stations	1	2	3	2	3	2	2	15	15
Frontier Quarantine Stations	1	-	-	-	-	1	1	3	3
Pharmacies:									
State Owned	6	6	5	7	9	5	6	44	42
Communal	8	7	3	10	9	11	8	56	47
Private	22	20	38	37	84	25	37	263	234

* Including two or more communes.

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Table 4. Malaria in Bulgaria; Spleen Indices in Certain Malarious Districts From Undated Official Data Published in August, 1934.

Region	District	Spleen Rate Per 100 Examined
Burgas	Aitos	17.1
	Burgas	36.0
	Elhovo	26.2
	Karnobat	33.0
	Pomorie	32.3
	Sliven	19.3
	Sredetz (Karabunar)	5.8
	Yambol	6.7
	Vasiliko	34.0
Vratza	Vidin	5.6
	Kula	5.6
	Lom	15.3
Plovdiv	Asenovgrad (Stanimaka)	24.0
	Karlovo	21.1
	Nevrokop	26.5
	Pazardzik	8.4
	Plovdiv	16.7
Pleven	Nikopol	21.4
	Pleven	8.0
	Svishtov	7.2
Sofia	Dupnitsa	5.6
	Petrich	15.6
	Sveti Vrach	15.6
Shumen	Bela	18.0
	Varna	9.0
	Kurbat (Balbunar)	6.5
	Provadia	20.0
	Razgrad	23.7
	Ruse	24.1

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APPENDIX C

Names of Officials, 1939-1941

P. D. Gabrovski, Minister of the Interior and Public Health (1941)

Dr. Ivan Balkansky, Director General, Directorate of Public Health, Ministry of the Interior and Public Health, Sofia (1941)

Dr. R. Radkoff, Director of Public Health, Directorate of Public Health, Sofia (also Member of the Malaria Commission of the League of Nations) (1939)

Dr. P. Kojuharoff, Chief of the Bacteriological and Epidemiological Department, Institute of Public Health, Sofia (1939)

Dr. Sharoff, Chief of the Department of Hygiene, Institute of Public Health, Sofia (1939)

Dr. H. Boyadjieff, Director of the Sofia Health Center (1939)

Penka Vajarof, Directeur Général de la Statistique, Statistique Générale du Royaume de Bulgarie, Sofia (1940)

Official Documents Relating to Public Health and Vital Statistics

Izveztija na Glavnata Direkcija na Narodnoto Zdrave (Bulletin of the State Department of Public Health, Bulgaria). Issued periodically since 1915. Contains monthly data on contagious diseases, institutions, rules and regulations, and occasionally, short articles on public health problems.

Annuaire statistique du Royaume de Bulgarie, 1939. Sofia, 1940, 850 pp,

Mouvement de la population, 1932-1935. Sofia, 1935.

Bulletin statistique mensuel du Royaume de Bulgarie.

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Bulgaria Administrative Divisions

<u>Regions</u>	<u>Districts</u>	<u>Regions</u>	<u>Districts</u>
I. BURGAS	1. Aitos 2. Burgas, urban 3. Burgas, rural 4. Elhovo (Kizil-Agach) 5. Karnobat 6. Kotel 7. Malko-Tirnov 8. Pomorié (Anhialo) 9. Sliven 10. Sredetz (Karabunar) 11. Yambol 12. Vasiliko	V. SOFIA	1. Botevgrad (Orhanié) 2. Breznik 3. Gorna Dzumaya 4. Dupnitsa 5. Ihtiman 6. Kustendil 7. Novoseltzi 8. Petrich 9. Pirdop 10. Radomir 11. Samokov 12. Sofia, urban 13. Sofia, rural 14. Trin 15. Tzaribrod 16. Sveti Vratsh
II. VRATZA	1. Berkovitsa 2. Bela Slatina 3. Bélogradchik 4. Vidin 5. Vratza 6. Kula 7. Lom 8. Orehovo 9. Ferdinand	VI. STARA- ZAGORA	1. Ardino (Egri-Déré) 2. Borisovgrad 3. Ivailovgrad (Orta-Koi) 4. Kazanlik 5. Krumovgrad (Kochukavak) 6. Kirdzali 7. Momchilgrad (Mastanli) 8. Nova-Zagora 9. Svilengrad 10. Stara-Zagora 11. Harmanli 12. Haskovo 13. Chirpan
III. PLOVDIV	1. Asenovgrad (Stanimaka) 2. Devine (Deuvlen) 3. Zlatograd (Dari-Déré) 4. Karlovo 5. Nevrokop 6. Pazardzik 7. Panagurishte 8. Peshtera 9. Plovdiv, urban 10. Plovdiv, rural 11. Razlog 12. Smolian (Pashmakli)	VII. SHUMEN	1. Bela 2. Varna, urban 3. Varna, rural 4. Isperih (Kemanlar) 5. Kurbat (Balbunar) 6. Novi-Pazar 7. Omortag (O.-Pazar) 8. Popovo 9. Preslav 10. Provadia 11. Razgrad 12. Ruse, urban 13. Ruse, rural 14. Targovishte (E.-Dzumaya) 15. Shumen
IV. PLEVEN	1. Gabrovo 2. Gorna-Orehovitsa 3. Drenovo 4. Elena 5. Lovech 6. Lukovit 7. Nikopol 8. Pleven 9. Svishtov 10. Sevlievo 11. Tetevene 12. Troyan 13. Tirnovo		

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APPENDIX D

Sanitation --- Control and Recommendations

a. Control.

1. Water. Since 1934 piped water supplies have been provided for increasing number of villages. In 1939, 43 towns and 453 villages had water supply systems (drinking water) which the League of Nations characterized, somewhat vaguely, as "less modern". 77 percent of the total urban population and 18 percent of the rural population - i.e. 31 percent of the total population - were said to have "reasonably modern" water supplies. It is not known whether these supplies are acceptable according to American sanitary criteria. In 1942 approximately 200 additional villages were supplied. All sources of water supply are examined by the health services; approximately 8,000 samples of water are tested each year. In 1934 Sofia completed a dam which gives the city ample water for present needs. In previous years there has been a shortage each summer, due to the lack of facilities for storage.

2. Sewage. In Sofia there is a system of sewers but there is no sewage disposal plant. The untreated effluent drains into the Iskar River, about six miles southeast of the city. Elsewhere cesspools and ditches are employed. Soil and stream pollution are widespread.

3. Miscellaneous Problems of Sanitation. Bulgaria is a country of impoverished backward peasants, undernourished but long-lived. Public health is still in the stage of organization and has as yet made relatively little progress.

The health problems of rural Bulgaria have been summarized as follows:

"a. The organization of a campaign against the high infant mortality rates and the high incidence of acute and chronic contagious diseases;

"b. Improved medical assistance and the provision of such assistance at an earlier stage in the villages;

"c. The inculcation of the main principles of prophylaxis among country dwellers (i.e., the development of education in health principles);

"d. The improvement of the diet of rural populations.

b. Recommendations. The following recommendations are for personnel operating in Bulgaria and are intended as a supplement to the general sanitary precautions ordinarily in force in all areas.

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(1) Water Supply. All water supplies (including municipal supplies) should be considered unsafe and should be accepted only after proper treatment or bacteriological tests frequently performed.

(2) Sewage. For all practical purposes the sewage disposal systems of Bulgaria may be regarded as non-existent. Hence, it will be necessary to arrange for local unit disposal wherever bodies of troops may be stationed.

(3) Malaria Control. Malaria is endemic in four main areas: the Danube region, the coast of the Black Sea, the Struma valley, the Maritza region. The incidence is highest in the Struma and Black Sea areas, less in the Maritza, and least but by no means inconsiderable in the Danube region. The malaria season runs from May to October, reaching its peak in the late summer.

Control measures are at the discretion of the surgeon and should include:

- (a) The use of bed nets, repellents, and protective clothing.
- (b) Screening and spraying of military buildings. Spraying may be conveniently accomplished by means of the Freon aerosol bomb. It will also be desirable to use this device in any civilian buildings which may be frequented by military personnel.
- (c) The installation of mosquito doors, which open against the wind.
- (d) Treatment of sites of mosquito breeding. Probably the use of Paris green will be more convenient than the use of oil. Special attention must be given to slowly running streams. The desirability of more fundamental procedures such as drainage and filling will depend on the military situation.
- (e) Drug prophylaxis, according to the method recommended by the Office of The Surgeon General, with modification according to circumstances.
- (f) Judicious selection of camp sites. These should if possible be placed at least two miles from breeding places and preferably at a greater altitude than the breeding places.

(4) Typhus. The administration of typhus vaccine should not be omitted. A continuous and vigorous campaign must be waged against the body louse since this insect transmits typhus (and also relapsing fever and trench fever). Measures recommended are:

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(a) Enforcement of personal cleanliness to the utmost possible under the circumstances. Ample facilities for bathing and laundering will be urgently necessary.

(b) The use of special delousing powder, to be dusted into the clothing. This powder is an item of general issue.

(c) The use of steam disinfection should not be necessary if (a) and (b) can be observed properly.

(d) Avoidance of contact with the native population.

(5) Food and Food handlers. Diarrheal diseases and intestinal infections are extremely common in Bulgaria. The following measures are recommended:

(a) Strict supervision of food handlers.

(b) Avoidance of local supplies of food and water except insofar as adequate treatment is possible. Locally produced ice is to be avoided under all circumstances. Troops should be warned against eating uncooked vegetables and berries.

(c) Strict supervision of local restaurants. These should be declared out of bounds if circumstances warrant such action.

(d) The control of flies by means of screens, sprays, fly-paper, swatting. Attention should be given to manure heaps and similar breeding places.

(e) Privies and latrines should be screened and must be kept clean.

(6) Venereal Diseases. Venereal diseases are especially prevalent in the seaports. A campaign of education and prophylaxis is recommended. Much of the success of the prophylactic campaign will depend on the availability of prophylactic devices, and on the accessibility and efficiency of prophylactic stations.

(7) The Acute Infectious Diseases. Diphtheria, scarlet fever and epidemic meningitis have been unusually prevalent in Bulgaria during recent years. The following measures are recommended:

(a) Since crowding is an important factor in the spread of these diseases, ample space should be provided, especially in barracks but also in mess halls, theatres, and other places where men may congregate.

(b) Men who actually have developed one of these diseases should be isolated promptly and their clothing, bedlinen and mess equipment should be disinfected.

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(c) Civilian areas should be declared out of bounds if an outbreak is in progress. During such times civilians should be forbidden to visit the Army posts.

(8) Sandflies. Sandflies carry papataci (sandfly fever), a disease which is capable of causing a high ineffective rate in military personnel. These insects are too small to be restrained by ordinary mosquito netting, and the special fine netting (45 to the inch) is frequently avoided or rejected by soldiers. Vegetation and rubbish should be cleared for an area of 300 yards from barracks and other buildings. So far as possible any old crumbling walls or ruins should be removed. Crevices should be filled. Buildings should be sprayed by means of the Freon aerosol bomb and the grounds should be oiled for 300 yards.

(9) Rabies. In Bulgaria, rabies occurs not only in human beings and in dogs but also in cats, cattle and pigs. Dogs are unusually numerous. It is recommended that the keeping of pet animals be forbidden, and that any dogs found on military reservations be removed. Men should be instructed that in the event that a soldier is bitten by an apparently rabid animal, the animal should, if possible, be taken alive and turned over to the Veterinary Corps Officer.

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APPENDIX E

a. Vectors of Disease.

1. Insects and Animals of Importance to Man and Their Control.--

a. Vectors of Disease.--(1) Mosquitoes. The following anopheline vectors occur in Bulgaria: Anopheles maculipennis var. typicus, A. maculipennis var. messeae, A. sacharovi (also called A. maculipennis var. elutus), A. superpictus, A. bifurcatus and A. pseudopictus. An element of vagueness is present in certain of the published records due to the fact that in some of the observations of A. maculipennis the varieties are not distinguished. It will be remembered that the varietal taxonomy of maculipennis is comparatively recent.

Hackett, in his book "Malaria in Europe" says: "In southern Europe malaria often uses a combination of two or more anopheline species to prolong the season. In the Balkans elutus (A. sacharovi) follows maculipennis [sc. typicus?, messeae?] and superpictus follows elutus, and though none of them has a very long season the combined transmission period lasts from May to October, with a correspondingly intense malaria".

The most widely disseminated vector species of Bulgaria is A. maculipennis. In the Danube valley the varieties messeae and typicus occur. In regions near the Black Sea typicus and elutus (A. sacharovi) are found, in addition to A. superpictus. Studies at Burgas on the Black Sea yielded elutus 75 percent, typicus 20 percent, messeae 5 percent. Near Petritch 95 percent of specimens of maculipennis were of the variety typicus. Here the infection index varied between 0.3 percent and 1.4 percent in different years, the average being 0.8 percent. Infected mosquitoes were found even in winter, although they were most numerous in July, August and September. The blood meals consisted of animal blood in 70-75 percent of specimens and of human blood in 25-30 percent. The maximum flight range was 4 km. (2½ miles).

Available descriptions of the ecology of Bulgarian vectors are fragmentary and must be supplemented by data derived from other areas. Anopheles maculipennis var. typicus in Bulgaria and elsewhere is not fastidious in its choice of breeding sites. It lays its eggs in fresh running water in plains or hilly regions, in springs, or even in stagnant water, in borrow pits, or close to the seacoast. This range of habitat is evidence of great adaptability. A. maculipennis var. typicus is zoophilic both in nature and in captivity. In a group of study areas near Petritch in southwestern Bulgaria satisfactory control was achieved by the use of Paris green. In other parts of the same region more fundamental engineering operations were performed, in order to control the channel of the Strumitza river during periods of diminished flow. It was also necessary to stop mosquito breeding in irrigation ditches; Paris green was used for this purpose. In the Petritch area the control problem included A. superpictus as well as A. maculipennis.

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A. pseudopictus in rice fields at Plovdiv. Both species are said not to enter homes and barns. In Palestine A. bifurcatus has been known to breed in cisterns under houses and thus produce intense urban malaria. It is not known whether a similar type of breeding occurs in Bulgaria.

No data have been found concerning the genera Culex and Aedes in Bulgaria. There is no evidence that diseases conveyed by Aedes aegypti -- i.e. yellow fever and dengue -- have ever been endemic in Bulgaria.

(2) Lice. Pediculus humanus var. corporis, the body louse, is common in Bulgaria. This insect is the vector of epidemic typhus fever, trench fever and relapsing fever. Phthirus pubis, the crab louse, is found throughout Europe and hence presumably occurs in Bulgaria.

(3) Flies.-- (a) Psychodidae (sandflies). Four species occur in Bulgaria: Phlebotomus papatasi, P. minutus, P. sergenti, and P. perniciosus. Phlebotomus flies are vectors of leishmaniasis and papataci fever (sandfly fever). No records have been found of the occurrence of leishmaniasis in Bulgaria. Papataci fever occurs especially in warm areas such as Plovdiv. Sandflies lay their eggs in cracks and crannies, in soil, old ruinous walls, piles of rubbish, and between boards of privies and cess-pools. The flying and biting occur at night. Control measures consist of cleaning and clearing of the ground, removal of debris, and filling of crannies. The ground in the immediate vicinity of barracks should be oiled.

(b) Muscidae. The common housefly, Musca domestica, is widespread throughout southern Europe. It is filthy in its habits and acts as a mechanical carrier of intestinal pathogens such as those of typhoid fever, paratyphoid, dysentery, and helminthiasis. Flies of the genus Stomoxys (stable flies, "biting houseflies") are said to be numerous in Bulgaria but precise data are not available.

(c) Other Diptera. Species of the families Ceratopogonidae (biting midges) are known to occur. The Sarcophagidae (flesh flies) are represented by the species Wohlfahrtia magnifica. Both this species and a species of Hypoderma (bot fly) and members of the Oestridae (sheep bots) have been known to produce human myiasis in Bulgaria.

(4) Ticks and Mites. Twenty-two species of ticks have been reported. These belong to the genera Ixodes, Rhipicephalus, Boophilus, Hyalomma, Dermacentor, Haemaphysalis, Alloцерaca and Argas. Table 1 lists species which are believed to be vectors of disease in Bulgaria or elsewhere. The chief tick-borne disease of man which is suspected to occur in Bulgaria is fievre boutonneuse, carried by Rhipicephalus sanguineus, the brown dog tick.

Tick paralysis of cattle, sheep and goats has been reported from southern Sorbia; its occurrence in Bulgaria is probable but definite records have not been found. In other countries the disease has occurred in man. Ixodes ricinus, a probable vector, occurs in Bulgaria.

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A. maculipennis var. messeae, a zoophilic variety, breeds in marshes and in the border zones of inland seas, where reeds are abundant. It is found in Italy in lakes and river valleys in stagnant or slowly flowing water. Whether these ecological relations hold for messeae in Bulgaria is not known. In available reports the control of messeae is not discussed as a separate entity.

A. sacharovi (syn. A. maculipennis var. elutus) is an extremely important vector. It ordinarily prefers brackish waters and can tolerate a higher degree of salinity than the maculipennis varieties previously mentioned. Studies in Albania showed however that sacharovi could not develop in water having salinity greater than 2.2 percent, a fact which has been used as a basis for control measures. Sacharovi breeds in coastal marshes such as those near the Black Sea, in inland marshes which are open to sunlight in midsummer, and in small temporary collections of water in which vegetation is present. It is found infrequently in slowly moving water. The species is avid for the blood of man. It enters dwellings and has a high sporozoite index. Control measures would presumably consist of drainage, dusting, and tide-gates; the latter would be employed to increase the salinity of certain coastal lagoons and marshes. The feasibility of airplane dusting would have to be considered. Buildings should be screened and sprayed.

A. superpictus is an extremely important vector in Bulgaria. It is encountered all over the southern part of the country and in the Alexandrovo (Vidin) and Varna districts in the north. A. superpictus is ordinarily said to breed in hill country in sunny or slightly shaded pools, beds of small streams, in rivers which are nearly dry, in irrigation systems, and rice fields. In Bulgaria it also breeds in clean slowly flowing brooks with sandy banks. Since these brooks are rapid in the spring, superpictus does not appear in large numbers until July and August. Years which have hot dry summers are known to be epidemic years in Bulgaria. Such years favor the breeding of superpictus; the mosquito then enters homes and stables regularly and bites man and animals, with the result that the infection index reaches 2-3 percent. In unfavorable years the numbers are smaller; superpictus then rarely enters houses and infected specimens are not found. Whereas superpictus is the principal vector in parts of Cyprus it was shown to be less important in Greek Macedonia in spite of its abundance and relatively high sporozoite index.

Control measures against superpictus should consist of the spraying and dusting of small streams and pools. For more enduring results it might be desirable to consider the regulation of the channels of streams during periods of reduced flow. It would also be necessary to remove boulders and other small obstructions such as logs.

A. bifurcatus and A. pseudopictus occur in Bulgaria but are not regarded as important. A. bifurcatus has been observed at Petritch and

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Mites. Sarcoptes scabiei, the mange mite, is common in Bulgaria, especially in schools and other institutions. The grain mite, Pediculoides ventricosus, ordinarily parasitic on insects, occasionally attacks man and produces acute dermatitis accompanied by vesiculation and fever. The inflammation may last for several weeks. The condition usually occurs during the autumn harvest. Trombicula autumnalis, a harvest mite, is common throughout southern and central Europe. It produces intense dermatitis.

(5) Fleas. Xenopsylla cheopis (the Oriental rat flea), Pulex irritans (the human flea), Ctenocephalus canis (the dog flea), C. felis (the cat flea), and Nosopsyllus fasciatus (European rat flea) are said to occur throughout Europe and hence presumably occur in Bulgaria.

(6) Rodents. The Norway rat (Rattus norvegicus) is assumed to be the species most prevalent, although adequate data are not available. The black rat, R. rattus rattus and the roof rat R. rattus alexandrinus are also believed to be present.

(7) Other animal species. The following are known to occur in southern Europe or in the Balkans and presumably occur in Bulgaria, although records have not been found. Scolopendra singulata, the common centipede, occurs in southern Europe. Its bite is painful and may be followed by urticaria. Buthus maurus, the poisonous black scorpion, occurs in southern Europe and the Balkans. Latrodectus tredecimguttatus (black widow spider) occurs in the Balkans. Its bite produces muscle pain and severe circulatory depression.

b. Snakes. Vipera ammodytes, the sandviper or long-nosed viper, occurs in Bulgaria. It prefers dry stony hills with low bushes, which it frequently climbs. Its bite is often fatal to man. The common viper (Vipera berus), a poisonous snake, and the less poisonous Orsini's viper (Vipera ursinii) have been reported from Yugoslavia.

c. Pests. Simuliidae (black flies, buffalo gnats).

Simulium reptans columbacense (Golubatz or Columbacz fly). This insect occurs in parts of Bulgaria, Rumania, and Yugoslavia, especially along the Danube. It is present in enormous numbers during April and May in certain years only; at such times it could interfere with military operations, since it is an active bloodsucker and causes painful bites. This insect is said to be most annoying in cloudy weather when the air is still. On the wind it may be carried 50 miles or more. Breeding occurs in running water, e.g., shallow creeks. Control is difficult.

Tabanidae (horseflies). Sixty-five species and varieties of these bloodsucking flies are known to occur in Bulgaria. They breed in water, earth, mud and sometimes in decaying wood. No data are available on the importance of Bulgarian tabanids in the transmission of disease.

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Presumably these insects act chiefly as pests. It should be remembered however that tabanidae are occasional transmitters of anthrax, a disease which is common in Bulgaria. Surra, a highly fatal disease of horses, has been reported in Bulgaria. The causative organism, Trypanosoma evansi, is believed to be transmitted by tabanids.

Dogs are extremely numerous in Bulgaria (1,384,520 reported in 1928); both rabies and echinococcus disease are common.

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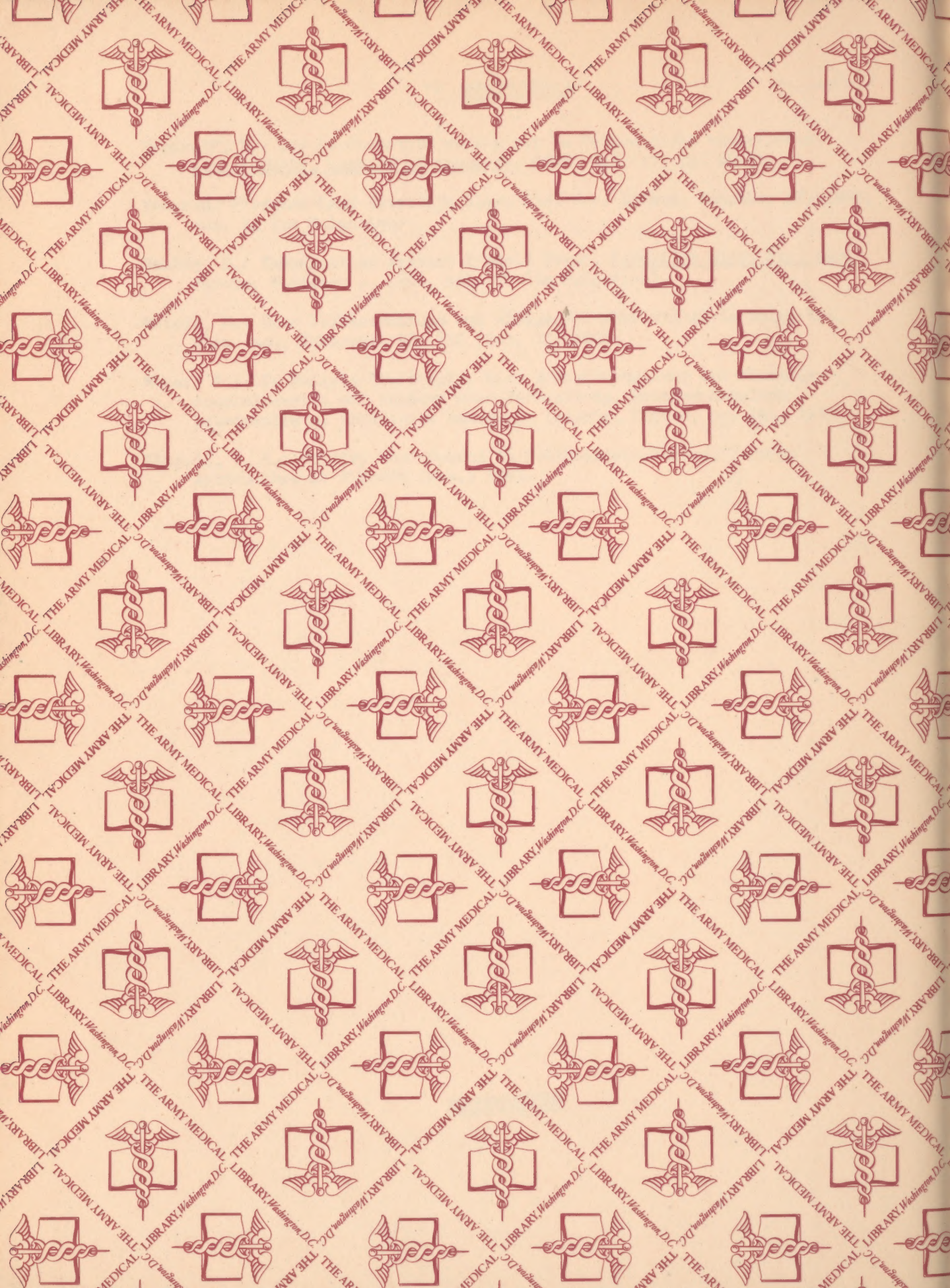
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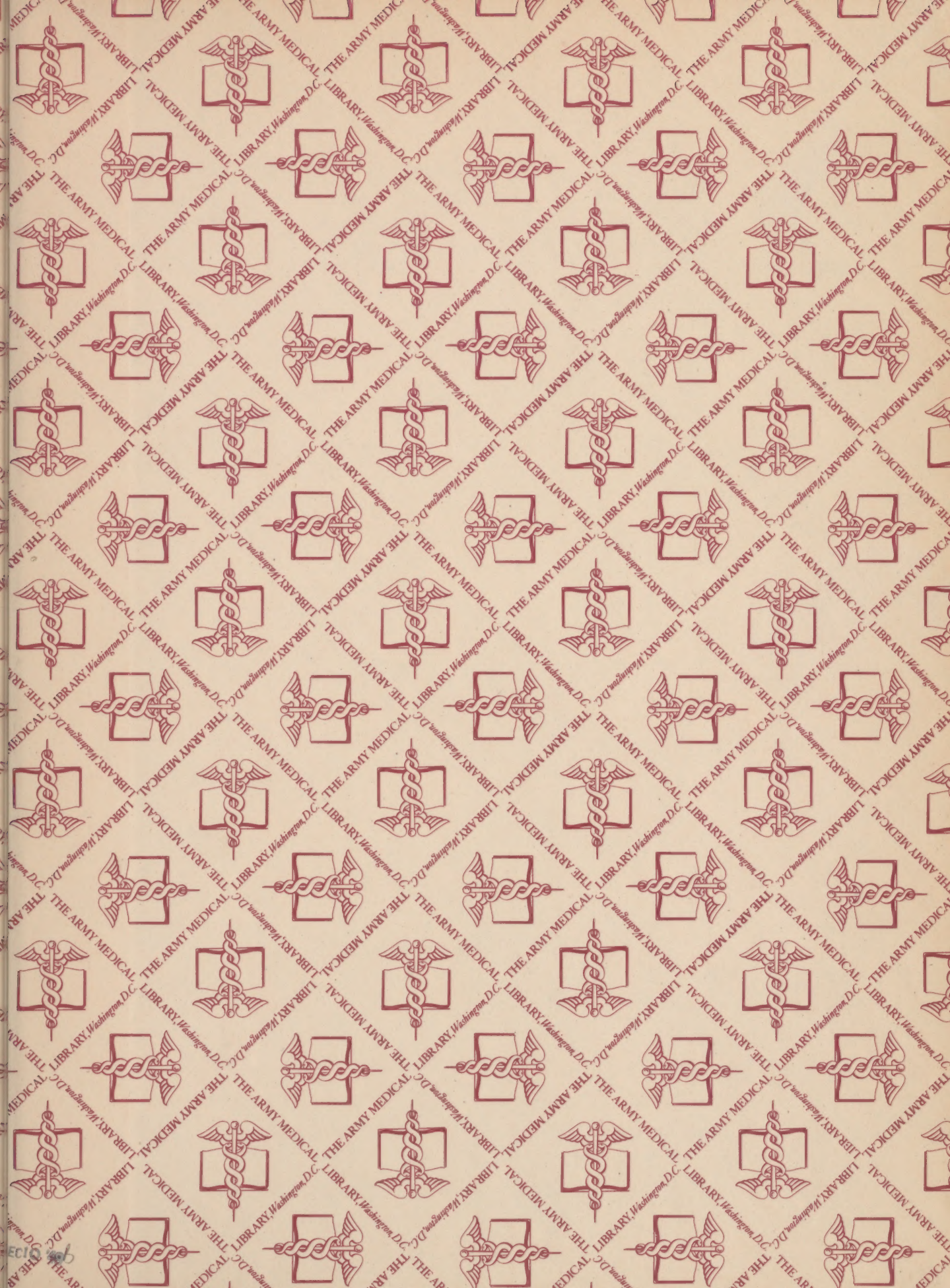
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